

UIC COVID-19 TASK FORCE

# RAILsilence

Masks ventilation and social distancing

State of the art - July 2020



INTERNATIONAL UNION  
OF RAILWAYS



# CONTENTS

<b>UIC COVID-19 TASK FORCE .....</b>	<b>5</b>
<b>1. WHY WEAR A MASK? .....</b>	<b>6</b>
1.1 MASKS ARE SHOWN TO LIMIT THE SPREAD OF COVID-19 .....	6
1.2 LEGAL REQUIREMENTS .....	7
<b>2. TYPES OF MASKS .....</b>	<b>9</b>
2.1 DIFFERENT TYPES OF MASKS .....	9
2.2 MEDICAL GRADE FACE MASKS .....	9
2.2.1 Single-use surgical masks .....	9
2.2.2 Single-use respirators.....	10
2.2.3 Difference between a mask and a respirator .....	11
2.3 FACE SHIELDS.....	12
2.4 REUSABLE CLOTH MASKS.....	12
2.5 OTHER CLOTH FACE COVERINGS.....	13
2.6 HOW EFFECTIVE ARE MASKS? .....	13
2.7 NORMS AND EQUIVALENCE BETWEEN INTERNATIONAL STANDARDS.....	14
2.7.1 Norms.....	14
2.7.2 Equivalence between international standards.....	14
<b>3. SOCIAL DISTANCING? .....</b>	<b>15</b>
3.1 WHY SOCIAL DISTANCING?.....	15
3.2 HOW TO SOCIAL DISTANCE .....	16
<b>4. MASKS, VENTILATION AND SOCIAL DISTANCING:     HOW DO THEY AFFECT ONE ANOTHER?.....</b>	<b>17</b>
4.1 HOW MUCH DOES VENTILATION IN A TRAIN MATTER?.....	17
4.2 VENTILATION EXAMPLES FROM RUS.....	18
<b>5. COMMUNICATION ABOUT MEASURES RELYING ON     MASKS AND ADAPTED VENTILATION ONLY     (AND NO SOCIAL DISTANCING) .....</b>	<b>20</b>
5.1 ASSESS THE CONTEXT OF USE OF MASKS .....	20
5.2 INTERNAL COMMUNICATION .....	20
5.3 EXTERNAL COMMUNICATION .....	23
<b>6. CONCLUSION .....</b>	<b>29</b>
<b>APPENDIX .....</b>	<b>30</b>
<b>BIBLIOGRAPHY.....</b>	<b>31</b>



# UIC COVID-19 TASK FORCE

Amid the coronavirus disease outbreak, UIC set up a task force combining UIC member companies, experts and other relevant stakeholders (AAR, AFRA, African Union, ALAF, AllRail, ANPTrilhos, APTA, CER, CIT, EIM, EPF, ERFA, ETF, ETOA, IATA, OTIF, UITP and UNECE) to work together to find ways to respond to this crisis that were adapted to the railway sector.

The UIC Covid-19 taskforce's main purpose is to provide a trusted space for our members and fellow transport associations to share information with one another regarding this crisis. As this is an unprecedented, global crisis, being able to come together and benefit from each other's experiences has been key in the fight to protect lives while still providing a minimum of our essential service: transport.

As this continues to be a global crisis, it needs a global response, and UIC is uniquely placed to create a space where rail stakeholders the world over can come together and cooperate. At our taskforce meetings we bring together railway stakeholders from Asia, Africa, Europe, the Middle East, Oceania and the Americas, and all are benefiting from each other's knowledge and experience.

Response to this crisis for the rail sector requires them to navigate a changing environment, with a day-to-day, agile approach, in the now and also continuing on to the short and medium terms.

Between March and July 2020, five UIC Guidances for Railway Stakeholders have been published and made available online at: <https://uic.org/covid-19>.

Since then, information has continued to be shared among members. All the information shared by the members is available upon joining the task force and registering to UIC extranet at the Covid-19 Task Force Workspace at <https://extranet.uic.org/index.php>.

Relevant multimedia information is available in the UIC Media Center at <https://mediacenter.uic.org.fr>. The UIC Covid-19 task force has also created a Linked-In group where relevant newspaper articles and upcoming webinars are shared. Join us: <https://www.linkedin.com/groups/13846065/>.

The UIC Covid-19 task force continues its important work of information sharing to this day, turning to the resumption and new normal phases. This document, however, focuses on **the landscape of face masks and respirators, face shields, reusable cloth masks and other cloth face coverings. It provides also an update on how masks and ventilation may reduce the need for social distancing.**



# 1. WHY WEAR A MASK?

This section will demonstrate why one should consider wearing masks: their effectiveness in the fight against Covid-19 and also national regulations.

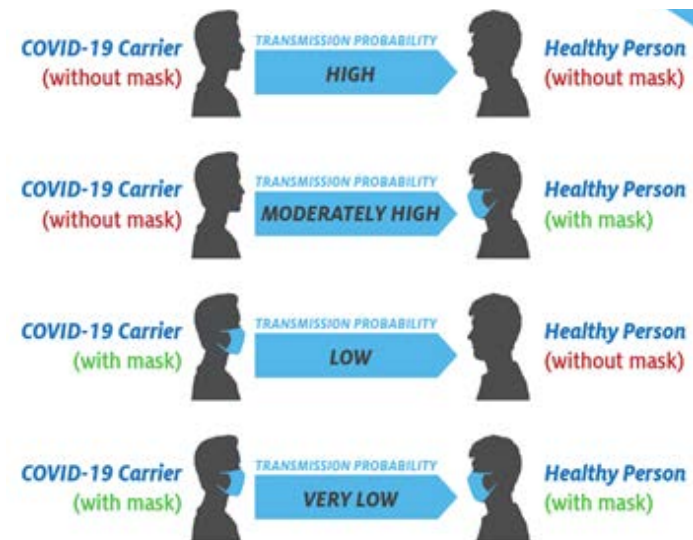
## 1.1 MASKS ARE SHOWN TO LIMIT THE SPREAD OF COVID-19

For a new virus with limited data, such as the coronavirus causing Covid-19, recommendations change as evidence becomes available. While high quality research regarding mask use is limited, all of the data supports mask wearing as a key public health measure to decrease viral spread. If their recommendations may have changed as better data becomes available, public health scientists and leading disease experts<sup>iiiiiv</sup> both agree that masks are effective at reducing the spread of Covid-19.

**Disease spread and transmission rate (R0):** Every infectious disease has a transmission rate (R0). A disease with an R0 of 1.0 means that every infected person, on average, infects one other person. A disease whose R0 is less than 1.0 will die out. During the beginning of the pandemics, the R0 of the virus which causes Covid-19 was estimated at 2.4 by Imperial College researchers, other research suggests it could be as high as 5.7<sup>v</sup>. Without containment measures, Covid-19 will spread far and fast. Moreover, Covid-19 patients are infectious in the early days of the disease, during which they generally have few or no symptoms or one to two days before symptoms appear<sup>vii</sup>.

**Droplets and aerosols:** During the breath, tiny micro droplets are ejected from the mouth. If you're infectious, these contain virus particles.

Only the very largest droplets end up surviving more than 0.1 s before drying out and turning into droplet nuclei (Wells 1934; Duguid 1946; Morawska et al. 2009) that are 3-5 times smaller than the original droplet itself, but still contain some virus.



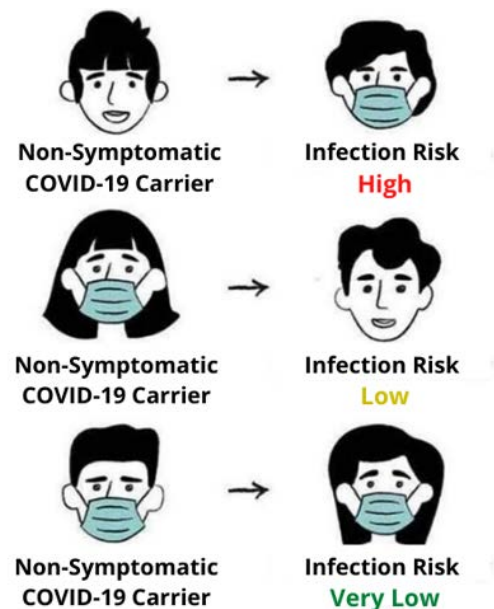
That means that it's much easier to block droplets just as they come out of the mouth, when they're much larger, compared to blocking them as they approach the face of a non-infected person who is on the receiving end of those droplets<sup>viii</sup>.

Thus, if people wear a mask in public, the transmission rate ("effective R") decreases and can go below 1.0, entirely stopping the spread of the disease. The mask doesn't have to block every single viral particle, but the more particles it blocks, the lower the effective R.



Mask-wearing by the public has been normalized in many Asian countries for several years, partly for individual reasons (to protect against pollution) and partly for collective ones (as a result of recent MERS and SARS epidemics or as protection against flu)<sup>ixx</sup>. JR East informed about the use of masks for flu, and the lower infection rate of flu in Japan vs. France for example.

However, in most of these countries where individuals already wore masks, the norm has been to only wear a mask if you have symptoms; it's only since the beginning of 2020, as awareness of asymptomatic spread has become better understood, that mask wearing regardless of symptoms has become common.



## 1.2 LEGAL REQUIREMENTS

Many of the measures that might be required (e.g. managing crowds, access to transport hubs and vehicles, maintaining physical distancing, etc.) have effects that go beyond the remit of public transport and should be developed in cooperation with health authorities and authorities, with a clear definition of the rights and obligations of each actor. Whilst laws appear to be highly effective at increasing compliance and slowing or stopping the spread of Covid-19, rail companies should follow their national legislation when it comes to mask wearing and enforcement, update their associated procedures and communication campaigns (see chapter 5) accordingly.

The Covid-19 is a rapidly evolving situation. Initially there was a significant shortage of masks for frontline workers, which was why authorities were reluctant to recommend mask wearing to the general public in some countries, in particular where mask wearing was not normalized. Having personal protective equipment for staff in order to keep them safe during this pandemic is a priority for railways. So much so, that certain companies have begun to manufacture their own masks. This is also to not reduce the stock of available masks to the medical sector. One example of this is from Network Rail (NR), who has designed a mask for maintenance staff that fits with their current safety helmets and are doing so from recycled plastic bottles. Another example is from Ferrovie dello Stato (FS) in Italy where due to the difficulties to obtain masks the group has decided to reorganize a maintenance place in Bologna into a mask manufacture.

From May 2020, FS are expected to manufacture surgery masks and FFP2 mask. The project was implemented by the task force set up by FS on the occasion of the health crisis from Covid-19 with a set target to reach the production of 240,000 surgical masks and 36 thousand FFP2 per day.

A world map showing where wearing of protective masks on passenger trains<sup>1</sup> is mandatory, optional, depending on local authorities or discouraged by health authorities is kept up to date on the basis of information from UIC task force members<sup>xi</sup>.



1. The wearing of masks then may still be obligatory in other instances i.e. public spaces.



## 2. TYPES OF MASKS

### 2.1 DIFFERENT TYPES OF MASKS

Respirators, surgical masks, face shields and face masks are examples of personal protective equipment that are used to protect the wearer from airborne particles and from liquid contaminating the face.

It is important to recognize that the optimal way to prevent airborne transmission is to use a combination of interventions, not just Personal Protective Equipment (PPE) alone.

For the purposes of this guidance, the following definitions are used.

**Face Mask** – A mask, with or without a face shield, that covers the user's nose and mouth and may or may not meet fluid barrier or filtration efficiency levels.

**Face Shield** - A face shield is a device used to protect the user's eyes and face from bodily fluids, liquid splashes, or potentially infectious materials. Generally, a face shield is situated at the crown of the head and is constructed with plastic to cover the user's eyes and face.

**Surgical Mask** – A mask that covers the user's nose and mouth and provides a physical barrier to fluids and particulate materials. The mask meets certain fluid barrier protection standards and flammability tests.

**Filtering Facepiece Respirator** – A filtering facepiece respirator (FFR) is a device that is a disposable half-face-piece non-powered air-purifying particulate respirator intended for use to cover the nose and mouth of the wearer to help reduce wearer exposure to pathogenic biological airborne particulates.

### 2.2 MEDICAL GRADE FACE MASKS

#### 2.2.1 Single-use surgical masks

A surgical mask is a loose-fitting, disposable device that creates a physical barrier between the mouth and nose of the wearer and potential contaminants in the immediate environment.

Surgical masks are not to be shared and may be labelled as surgical, isolation, dental, or medical procedure masks. They may come with or without a face shield.

These are often referred to as face masks, although not all face masks are regulated as surgical masks.

Surgical masks are made in different thicknesses and with different ability to protect you from contact with liquids. These properties may also affect how easily you can breathe through the face mask and how well the surgical mask protects you.



If worn properly, a surgical mask is meant to help block large-particle droplets, splashes, sprays, or splatter that may contain germs (viruses and bacteria), keeping it from reaching your mouth and nose.

Surgical masks may also help reduce exposure of your saliva and respiratory secretions to others.

While a surgical mask may be effective in blocking splashes and large-particle droplets, a face mask, by design, does not filter or block very small particles in the air that may be transmitted by coughs, sneezes, or certain medical procedures.

Surgical masks also do not provide complete protection from germs and other contaminants because of the loose fit between the surface of the face mask and your face.

Surgical masks are not intended to be used more than once, and more than four hours. If your mask is damaged, wet or soiled, or if breathing through the mask becomes difficult, you should remove the face mask, discard it safely, and replace it with a new one. To safely discard your mask, place it in a plastic bag and put it in the trash. Wash your hands after handling the used mask.

## 2.2.2 Single-use respirators

A respirator is a respiratory protective device designed to achieve a very close facial fit and very efficient filtration of airborne particles.

The 'N95' designation means that when subjected to careful testing, the respirator blocks at least 95 percent of very small (0.3 micron) test particles. If properly fitted, the filtration capabilities of N95 respirators exceed those of face masks.

However, even a properly fitted N95 respirator does not completely eliminate the risk of illness or death.

At least two types of N95 Respirators can be distinguished:

- N95 Respirator – A disposable half-mask filtering facepiece respirator (FFR) that covers the user's airway (nose and mouth) and offers protection from particulate materials at an N95 filtration efficiency level.
- Surgical N95 Respirator – A disposable FFR used in a healthcare setting that is worn by health care professional during procedures to protect both the patient and health care professional from the transfer of microorganisms, body fluids, and particulate material at an N95 filtration efficiency level.



### General N95 respirators precautions

People with chronic respiratory, cardiac, or other medical conditions that make breathing difficult should check with their health care provider before using an N95 respirator because the N95 respirator can make it more difficult for the wearer to breathe. Some models have exhalation valves that can make breathing out easier and help reduce heat build-up. Note that N95 respirators with exhalation valves should not be used when sterile conditions are needed.

N95 respirators are labelled as “single-use,” disposable devices. If the respirator is damaged or soiled, or if breathing becomes difficult, the respirator should be removed, discarded properly, and replaced with a new one. To safely discard a N95 respirator, it shall be placed in a plastic bag and put in the trash. Hands must be washed after handling the used respirator.

N95 respirators are not designed for children or people with facial hair. Because a proper fit cannot be achieved for children or people with facial hair, the N95 respirator may not provide full protection.

### N95 Respirators in industrial and health care settings

Most N95 respirators are manufactured for use in construction and other industrial type jobs that expose workers to dust and small particles. Some N95 respirators are intended for use in a health care setting. Specifically, single-use, disposable respiratory protective devices used and worn by health care personnel during procedures to protect both the patient and health care personnel from the transfer of microorganisms, body fluids, and particulate material.

Some respirators may be labelled or otherwise represented as filtering surgical smoke or plumes, filtering specific amounts of viruses or bacteria, reducing the amount of and/or killing viruses, bacteria, or fungi, or affecting allergenicity.

Some respirators may contain coating technologies unrelated to filtration (e.g., to reduce and or kill microorganisms).

### 2.2.3 Difference between a mask and a respirator

Both cover a wearer’s nose and mouth, but they differ in several aspects.

Masks are loose fitting and may not provide full protection from breathing in airborne pathogens, such as viruses.

Face masks (non-surgical masks) may not provide protection from fluids or may not filter particles, needed to protect against pathogens, such as viruses. They are not for surgical use and are not considered personal protective equipment.

Surgical masks are fluid-resistant, disposable, and loose-fitting devices that create a physical barrier between the mouth and nose of the wearer and the immediate environment. They are for use in surgical settings and do not provide full protection from inhalation of airborne pathogens, such as viruses.

Respirators are personal protective equipment that tightly fit the face and filter airborne particles to protect health care workers. They provide a higher level of protection against viruses and bacteria when properly fit-tested.

## 2.3 FACE SHIELDS

Some of the clear plastic face shields might replace masks as a more comfortable and more effective deterrent to Covid-19 as well as a great help from touching your face. To be most effective in stopping viral spread, a face shield should extend to below the chin, should also cover the ears and there should be no exposed gap between the forehead and the shield's headpiece<sup>xii</sup>. If the face shield design does not comply with such requirement, it shall only be considered as complementary to mask wearing.



Besides, difficulty to assist hearing impaired passengers with common masks should be highlighted, as they cover the mouth which is used as the first mean to communicate with people who do not know sign language. In those cases, the use of face shields or transparent visors or masks with a transparent part in the mouth is a solution.

In addition, face shields form a barrier that keeps people from easily touching their own faces. When speaking, people sometimes pull down a mask to make things easier -- but that isn't necessary with a face shield. The use of a face shield is also a reminder to maintain social distancing but allows visibility of facial expressions and lip movements for speech perception.

Face shields can be quickly and affordably produced and distributed, are endlessly reusable, require a simple cleaning with soap and water or common disinfectants and are one convenient way to complement mask wearing for most of the models.

## 2.4 REUSABLE CLOTH MASKS

Because the mask should only be used once and thrown away right after used, the sudden growing demand on face masks has made the number of available masks become insufficient. In this situation, people need a way to use less facemask but still can shield themselves from the illness.

Cloth masks maybe be home made, from household items or made in a factory. They should ideally be made of at least three layers of fabric, the outer layer of the mask should have a water-resistant fabric, the inner layer should be water-absorbent and the middle layer should act as a filter<sup>xiii</sup>. They are intended to be reused and cloth masks should be washed after each use. It is important to always remove reusable cloth masks correctly and wash your hands after handling or touching a reusable cloth mask.

## 2.5 OTHER CLOTH FACE COVERINGS

The use of simple cloth face coverings when in a public setting is recommended to slow the spread of the virus, since this will help people who may have the virus and do not know it from transmitting it to others. Cloth face coverings provide an extra layer to help prevent the respiratory droplets from traveling in the air and onto other people. While there was a world shortage of single-use masks and also the materials for homemade masks (e.g. elastic bands), many authorities authorise the use of other face coverings such as scarves<sup>xiv</sup>. It is important to always remove face coverings correctly and wash your hands after handling or touching a used face covering.



*Different types of masks (photo credit: ÖBB)*

## 2.6 HOW EFFECTIVE ARE MASKS?

Masks are not 100% effective, but mask wearing does decrease the risk of viral spread. N-95 masks are 95% effective at keeping the wearer free of inhaling viral particles, are still best reserved for front-line workers in high risk settings where aerosols of viral particles occur. Surgical masks are less effective and cloth face coverings even less so in protecting the wearer. However even a 50% reduction in viral transmission is statistically important. For the general public, the reason for wearing a facial covering is to help protect others from you when you cough, sneeze or even talk and therefore spray viral droplets into the air. Many people who become infected can unknowingly spread the Covid-19 virus because they have few or no symptoms. So wearing a mask is showing respect for others and is your way of helping lessen the spread of the disease.

Masks are designed to be breathed through. It is important that the mask not be so thick as to make breathing through them completely uncomfortable. Filter inserts are probably not necessary and may make the masks more uncomfortable. There is no evidence that low oxygen levels occur when masks are worn, however, there is some evidence<sup>xv</sup> that prolonged use of N-95 masks in people with preexisting lung disease could cause some build-up of carbon dioxide levels in the body. People with preexisting lung problems should discuss mask wearing concerns with their health care providers.



## 2.7 NORMS AND EQUIVALENCE BETWEEN INTERNATIONAL STANDARDS

### 2.7.1 Norms

To support global efforts in dealing with the Covid-19 crisis, most organizations have compiled a series of specific norms relative to Covid-19 that lists the highest requirements for medical and protective equipment such as: Surgical masks, Medical face masks, Respiratory protective devices, Personal eye-protection and many more.

Most organizations have made them freely available: ISO has created a web page where stakeholders can get access freely to the standards in read-only format<sup>xvi</sup>, European standards organizations CEN and CENELEC in agreement with all their Members and in agreement with the European Commission is providing free access a series of European standards (ENs) for medical devices and personal protective equipment, in a move to support the fight against the COVID-19 pandemic<sup>xvii</sup>. And many more<sup>xviiiix</sup>.

The aim is to tackle the severe shortage of protective masks, gloves and other products currently faced by many countries. Providing free access to the standards will facilitate the work of the many companies wishing to reconvert their production lines in order to manufacture the equipment that is so urgently needed. The standards are aimed purely at professional users.

### 2.7.2 Equivalence between international standards

Masks go by different names in different countries based on their independent certification systems. Due to possible shortage of masks or following international procurement process, Rail Undertakers may have to consider using equally effective alternate options.

A table providing equivalence between Australian, Brazilian, Chinese, Korean, European, Japanese, Mexican and US norms has been catalogued for FP2 and FP3 type masks by customs services<sup>xxxxi</sup> in the Annex of this document.



## 3. SOCIAL DISTANCING?

### 3.1 WHY SOCIAL DISTANCING?

The only way to achieve 100% avoidance of infection is to isolate oneself completely, which is not practical or mentally helpful for most people. The next steps are to act to limit the likelihood of spread from person to person, which include distancing and mask wearing.

Distance from people should be kept during the Covid-19 pandemic, but it does not mean to stop being social. Actually, it is important to keep in touch and continue to be social with family and friends for our own mental health and wellbeing. Phone calls, video calls and social media help people to stay connected.

Physical distancing, which would be a better term to use, helps reduce the risk of a virus being transmitted. The further away you are from an infected patient, the less likely you are to get the virus.

Physical distancing includes:

- Keeping 1 to 2 meters between you and other people. At some point the distance away becomes statistically meaningless and unfortunately, there is no absolute correct number. Airflow (indoor, outdoor, ventilation, wind, etc), temperature, humidity, the viral load being produced by the infected person and the susceptibility of the uninfected person all play a role in how far apart you need to be. UIC members responding to the UIC task force third questionnaire shared a distance between 1 and 2 meters: “Six feet is better than two feet and 12 feet is probably better than six”;
- Not shaking hands, hugging and kissing;
- Avoiding gatherings in enclosed spaces;
- Avoiding crowds and mass gathering where it is difficult to keep a reasonable distance from other (about 1 to 2 metres).



Requirement in Switzerland (SBB) is to keep a distance of 2 meters.

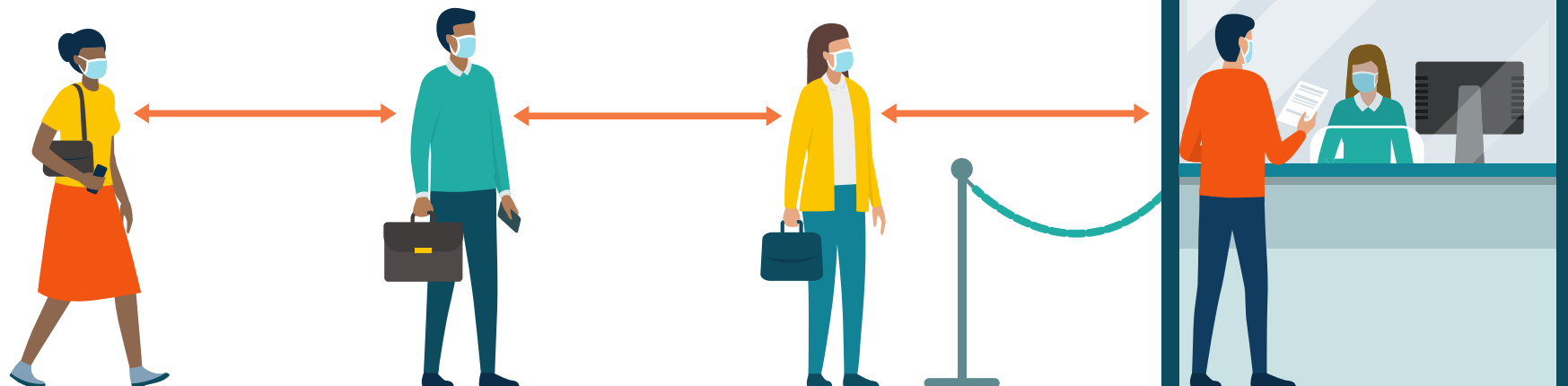
## 3.2 HOW TO SOCIAL DISTANCE

Whilst social distancing helps limit opportunities to come in contact with contaminated surfaces and infected people outside the home, it is incredibly important for governments and rail undertakers to reassure people and give a strong support in combining measures<sup>xxii</sup> i.e. for social distancing to be in place, for masks to be worn and for hand sanitiser to be available on public transport and this advice must be clear, consistent, and realistic.

As much as they might want it, people understand that on one hand that it will be impossible to give absolute guarantees<sup>xxiii</sup> and on the other hand that implementing several measures enables to reduce social distancing if not to remove it and to go back to a “new normal” situation.

This applies both to when on board the trains and when in stations boarding trains as stations have to deal with a limited number of platforms receiving several thousands of people at the same time.

As masks designs happen also to be key in this action, it is utmost important to communicate<sup>xxiv</sup> on better designs for face masks, especially for those stitching masks at home<sup>xxv</sup>.



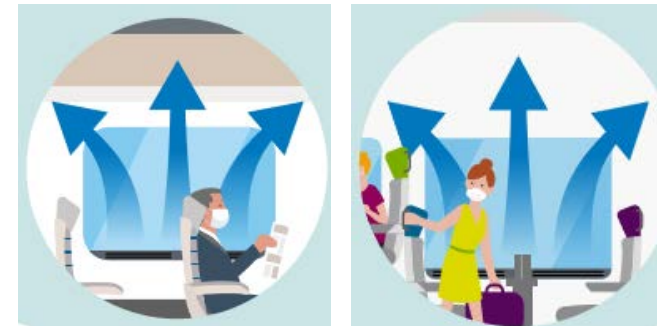
## 4. MASKS, VENTILATION AND SOCIAL DISTANCING: HOW DO THEY AFFECT ONE ANOTHER?

Because masks are better at containing virus exhaled by the wearer, if everyone wears masks, protection is two-way, containing their own virus and protecting from others' exhaled virus. If there is little or no ventilation present, the masks are even more effective, as virus will start to build up in the air, so distancing alone is not effective if the virus is distributed throughout the carriage.

Type and quality of ventilation matter. In this context health experts<sup>xxvi</sup> recommend renewing internal air at most by an intake of external air and to favour indirect ventilation systems. That is the reason why several railway undertakers have emphasized the benefits of increased ventilation in rail coaches or are proceeding with open-windows/AC switched-off operations when temperature raises, together with other measures such as asking passengers to limit their movements on board to the strict minimum.

### 4.1 HOW MUCH DOES VENTILATION IN A TRAIN MATTER?

The ventilation on a train matters and is associated to the type of ventilation and other protecting measures in place: being in a vehicle with poor ventilation that doesn't adequately circulate infected air probably makes a difference, but the idea that a ventilation system could play a perverse role by spreading the virus has far less support.



Worries about spread through ventilation systems were sparked by a study<sup>xxvii</sup> tracing an outbreak of Covid-19 in a restaurant in China that suggested that air conditioning could have played a role in spreading contagion. While the study concluded that key factor for the infection in the restaurant was the direction of the air conditioning's flow, experts have suggested that the cause of this single reported case was more likely the proximity of the people in the room and have recommended among others wearing masks, attending to good hand hygiene, disinfecting surfaces and improving ventilation. Indeed, there are no reports on infection via ventilation systems: the way of the air through the system is much longer than direct transmission, most aerosol drops are large enough to be stopped even by dust filters, and the air in the ventilation system is mixed with fresh air and maybe heated.

Thus when considering ways to protect staff and passengers and slow the spread of Covid-19, in addition to the protecting measures in place, RU are giving great attention and monitoring closely the quality of ventilation in coaches: direction and speed of flow, increased mix of fresh air and shorter time of air renewal cycle together with an adequate process for maintenance of filters.

The air filters in almost all trains and busses are rated not better than G4 which is fine for dust but not effective to filter viruses and nanoparticles. Higher filter classes like F7 filters (standard in buildings) have higher resistance and will not work in most trains and other public transport vehicles, the same is true for HEPA filters. Increased ventilation (mixing in more fresh air) might be an improvement, regular maintenance / cleaning of the system should be natural, and it might be advisable to wear FFP2/N95 masks at maintenance of the ventilation system, esp. when working overhead.

## 4.2 VENTILATION EXAMPLES FROM RUS

The following are contributions of UIC Covid-19 taskforce members as of June 2020 concerning ventilation. Inputs were received in responses to UIC task force questionnaires, as direct contribution in the UIC forum or presented during the bi-weekly task force meetings. The following table lists their examples :

Company	Example
Public Transport Authority (Australia)	Have undertaken a review of filters provided on our railcars and are satisfied with the current provisions (Note: not HEPA filters). Have not implemented any changes or considering any other measures at present.

Company	Example
SNCF (France)	<p>Ventilation systems in their trains are very efficient as there is a permanent external air intake. The AC operates sucking inside air and mixing it to external air, then cooled or heated according to the season. In respect of ratio, it depends on the rolling stock type: for TGV (High speed trains) this is one third of external air and two third of internal air which is filtered every three minutes. For intercity trains, the ratio of external air is 40%.</p> <p>There is no direct ventilation/AC design in all SNCF trains as for reasons of passenger comfort, indirect and light ventilation were selected. In High Speed trains, air is thus totally renewed every nine minutes. In other trains, thanks to a permanent air intake, air is totally renewed every five to eight minutes (according to the rolling stock type) with no stagnation of inside air. Air is distributed from the bottom upwards limiting the risk further.</p>



Figure 1: Figure from SNCF demonstrating how the air circulates in their ventilation systems on board TGV and other trains

Company	Example
<b>TrainOSE (Greece)</b>	Ensures permanent ventilation inside the train and changes the air filters often.
<b>Gysev (Hungary-Austria)</b>	Uses ozone generators on trains in order to disinfect the air-condition system.
<b>JR-East (Japan)</b>	Applies the same technology that is used in aircrafts to replace the air in the room in minutes on their SHINKANSEN trains. More information is available at the official site of JR East <sup>xviii</sup> . For trains not equipped with a ventilation system, windows are left open. This is also true for the windows in stations.

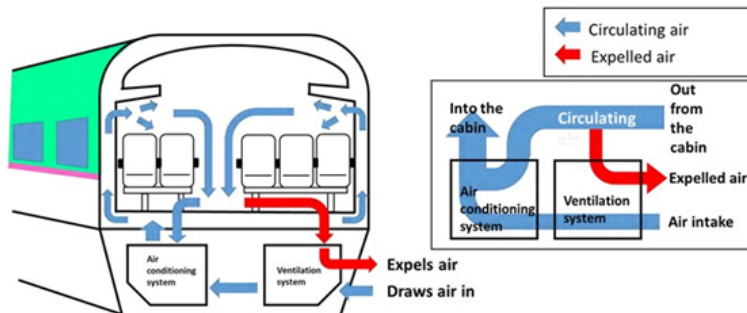


Figure 2: JR East figure showing how the ventilation works on their SHINKANSEN trains © JR East



Figure 3: JR East Figure showing an open window on a train © JR East

Company	Example
<b>ONCF (Morocco)</b>	Upgraded the class of the air conditioning filters in trains from class G4 to class M5 or M6 in accordance with the EN779 standard.
<b>RZD (Russia)</b>	Inspects the ventilation system regularly and constantly airs the premises. Air disinfectants (ultraviolet bactericidal irradiators-recirculatory for room disinfection) have been installed on the premises of the Transportation Control Centers.
<b>Lithuanian Railways (Lithuania)</b>	Has applied more frequent ventilation protocols.
<b>FGC (Spain)</b>	Has increased air filter cleaning (although it is a complicated procedure that requires high level protection for the staff) and the installation of HEPA filters has been considered although there were issues regarding the air flow. Also considering increased ventilation of the trains (depending on the architecture of the train unit).
<b>KORAIL (South Korea)</b>	Uses air curtains to block or secure an infect zone.

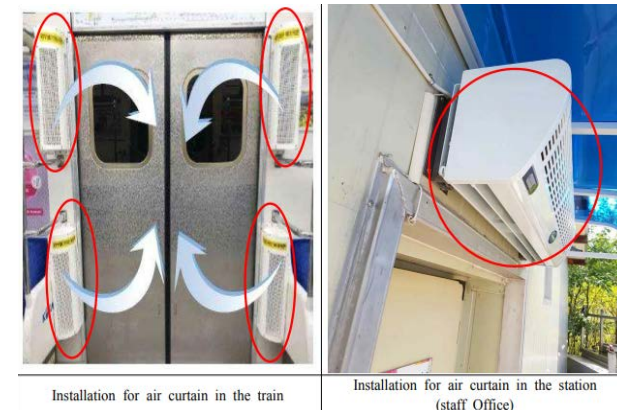


Figure 4: Figure from KORAIL of air curtains



## 5. COMMUNICATION ABOUT MEASURES RELYING ON MASKS AND ADAPTED VENTILATION ONLY (and no social distancing)

The easing of station access and travel on board trains and all lifting of operational restrictions should be gradual and accompanied by constantly updated campaigns to communicate clearly all the measures taken. The objective is to facilitate their smooth implementation, reassure staff and passengers and maintain their confidence in public transport.

### 5.1 ASSESS THE CONTEXT OF USE OF MASKS

As addressed in UIC Covid-19 Taskforce guidance “How the rail sector fought Covid-19 during lockdowns”, when it comes to the use of masks as a mitigation measure, cultural issues need to be taken into account. In many Asian cultures, people have been using masks to fight the spread of disease, and especially the flu, since before Covid-19 and thus are well equipped (aka educated as well as having availability of) to use masks in this fight.

Thus, asking passengers and staff to wear masks is very understandable. However, in other cultures, like for example Europe and USA, wearing masks has been only recently part of the fight against the spread of disease.

Having personal protective equipment for staff in order to keep them safe during this pandemic is a priority for railways and following coordination with national and/or local authorities, procedures have been implemented that in the event of a suspected case, the potentially infected person, whether they be staff, a passenger or simply a citizen in a train station, should be isolated and given a mask or some other tissue/fabric to breathe through while waiting for the appropriate authorities to take the person into their care.

For passengers, very few authorities required the public to wear masks in public, including on railways, during lockdowns. When it has become mandatory or not, communication is utmost important, whether internal or external.

This guidance provides examples of such communication, all collected from responses received following the questionnaires developed by UIC Covid-19 taskforce and from direct contributions from members during the bi-weekly task force meetings and webinars organized by UIC.

### 5.2 INTERNAL COMMUNICATION

Communication channels for Covid-19 related information to staff include the internet (company websites and their internal sites, e.g. intranet), e-mail, posters, brochures/ leaflets, and social media.

Other communication channels which were mentioned include: screen savers, hotlines, notice boards, SMS, telephone and video clips.



As railway undertakings have made personal protective equipment quickly available to front line staff at a minimum, some like KORAIL, are requiring staff to wear masks even in their headquarters and other buildings, information on masks have been disseminated throughout the companies as part of the general security information.

Many also shared to have communicated explicitly about masks and ventilation in coaches following new procedures linked to update directives from authorities on social distancing in public transport:

As highlighted in earlier guidance documents issued by UIC Covid-19 taskforce, when asked how railway undertakings update their staff in real time on the topic, the four main communication channels cited were the company Intranet, e-mail, SMS and Management Structure. Some companies use the beginning of the work shift as an opportunity to update staff. Social media, smartphones & tablets as well as smartphone applications were also mentioned by several respondents.

#### From SBB (Switzerland):



#### ➤ Gardez vos distances!

Si ce n'est pas possible, l'organisation du travail et les processus seront adaptés et des moyens techniques seront mis en œuvre (p. ex. vitres en plexiglas).

- En cas d'impossibilité: **portez des masques.**  
Les assistantes et assistants clientèle peuvent en obtenir aux dépôts.
- Respectez les règles d'hygiène de l'OFSP – **lavez-vous régulièrement les mains.**



## From SNCF (France):

### COVID 19 POSE ET RETRAIT MASQUE CHIRURGICAL 1/2

Version 02 04 2020  
DGOP – DGI

**IMPORTANT** FICHE PRÉVENTION SANITAIRE COVID 19 - COM 10

#### > GESTES BARRIÈRES À RESPECTER



#### > COMMENT SE PORTE-T-IL ?



#### > UNE FOIS AJUSTÉ ET MIS

Ne plus le toucher / Ne pas le réutiliser / Ne pas le conserver autour du cou

#### > DURÉE D'UTILISATION

+ Mettre le masque suivant les prescriptions des fiches de prévention sanitaires et de la notice.  
+ **Au maximum toutes les 4 heures**  
+ Dès qu'il est mouillé

#### > AVANT DE METTRE UN MASQUE

+ **Se laver les mains** à l'eau et au savon ou avec une solution hydro-alcoolique  
+ **Lorsque l'on porte un masque, éviter de le toucher**; ne pas déplacer le masque  
+ Chaque fois que l'on touche un masque usagé, se laver les mains à l'aide à l'eau et au savon ou à l'aide d'une solution hydro-alcoolique  
+ Si besoin de boire ou de manger, ou s'il s'humidifie, **remplacer par un nouveau masque et ne pas réutiliser des masques à usage unique.**

### COVID 19 POSE ET RETRAIT MASQUE CHIRURGICAL 2 /2

Version 02 04 2020  
DGOP – DGI

**IMPORTANT** FICHE PRÉVENTION SANITAIRE COVID 19 - COM 10

#### > COMMENT LE RETIRER

- 1/ L'enlever par l'arrière : défaire les liens ou ôter les élastiques, ne pas toucher l'avant du masque
- 2/ Le mettre immédiatement dans le sac plastique que l'on referme et le jeter dans les ordures ménagères.
- 3/ Se laver les mains à l'eau et au savon ou se frictionner les mains avec une solution hydroalcoolique.

#### > VIGILANCE !



**Le masque à l'envers**  
La baguette nasale ne doit pas être placée vers le bas pour éviter les fuites. Le côté coté extérieur ne doit pas être porté contre la peau à la place du côté plus clair pour assurer une filtration optimale.

**Les deux lanières croisées au-dessus des oreilles**  
Absence d'étanchéité du masque due à l'ouverture créée sur les côtés.

**Les deux lanières attachées au-dessus des oreilles**  
Absence d'étanchéité du masque due à l'ouverture créée sur les côtés.



**Le masque suspendu**  
Risque de contamination par des agents infectieux transmis par gouttelettes.



**Le masque dans la poche**  
Risque de contamination de la poche puis des mains par des agents infectieux transmis par gouttelettes.

#### IMPORTANT A SAVOIR

- + Le masque est à usage unique et ne peut être réutilisé une fois enlevé, ni enlevé à moitié
- + Il doit toujours être jeté à la poubelle
- + Il ne doit pas être transporté de mains en mains ni dans votre poche

#### DÉCHETS !

Ce déchet est assimilé aux ordures ménagères et devra donc être déposé dans un sac poubelle à disposition dans les locaux ou sur les chantiers.

Ces mesures complémentaires destinées à prévenir du risque du Coronavirus ne doivent pas entraîner un non-respect des consignes et règles de sécurité existantes (normes, procédures, port des EPIs, RQS, ...)



### POUR VOTRE SÉCURITÉ ET CELLE DE VOTRE ENTOURAGE, VOUS DEVEZ PORTER LES MASQUES CHIRURGICAUX FOURNIS PAR L'ENTREPRISE SUR LE LIEU DE TRAVAIL .

Le masque n'est efficace que s'il est associé au respect des gestes barrières en vigueur (se laver les mains, éternuer dans sa manche ou son coude, utiliser des mouchoirs à usage unique, respecter dès que possible les mesures de distanciation...).

#### Rappel : mettre correctement son masque chirurgical



**lavez-vous les mains** à l'eau et au savon ou à défaut avec du gel hydro alcoolique



**attachez le masque,** bord rigide en haut, **côté bleu vers l'extérieur**



**ajustez le masque** sur le haut du nez et en dessous du menton

Une fois utilisé, jetez le masque dans les poubelles dédiées COVID19 ou dans les ordures ménagères après avoir été enfermés dans un sachet plastique dédié et lavez-vous les mains après.

AGENCE DE COMMUNICATION RÉGIONALE TER SUD PROVENCE-ALPES-CÔTE D'AZUR  
DOCUMENT RÉSERVÉ À L'INTERNE



## COVID 19

Nb de personnes maximum autorisé sans port de masque :



### 5.3 EXTERNAL COMMUNICATION

External communication means exchange of information both within the railway undertakings organizations and outside the organizations.

Regardless of how it is established – via a letter, email, telephone or social media, on board and in station announcements and displays, posters, company websites, traditional media and brochures- the efficient external communication is a key step in sending the outside world an important message about the specific work achieved and the quality of the operations with the objective of bringing back confidence in rail transport.

Such communication should strive both at getting people back in daily commuting and consider again booking long distance travels.

Communication will also help the customer to be aware of the changes both in domestic and in international travel when the rules from the country of arrival and the country of departure might be different. In some countries like Austria mask wearing was only compulsory in the railway premises, then it was extended and compulsory onboard but not within the station.

In Switzerland it was a recommendation and became later on compulsory.

From Ferrocarrils de la Generalitat de Catalunya (Spain):





## From JR East (Japan):

Announcement about train ventilation system are made in the train, website for reducing anxiety of passenger.

### For on-site workers (Station staff, Train crew etc.)

- **Compulsory** wearing of face mask
- They have many cases to meet anonymous passengers directly



### For Passengers

- Use of station displays to show reminders about **handwashing, cough etiquette, how to wear face mask etc. in four languages.**



## Instruction on wearing face mask

**If you will not follow below rules, facemask may lead to infect.**

- You should know correct way of **wearing**, and follow it.

#### Correct way to wear a mask.



1. Ensure both your nose and mouth are covered.

2. Place the rubber string over your ears.

3. Cover up to your nose so there are no gaps.



Wear a mask (covering mouth and nose)

Cover your mouth or nose with a tissue/handkerchief.

Cough or sneeze into your sleeve.

- **Don't touch your face and eyes before washing hands, even if you wear face mask.**
- **When you put off your face mask, don't touch the outside of it. After dispose it, washing your hand first.**
- **If you have a reusable type of face mask. You should reuse it after washing/sanitizing.**

### Communication

## By poster and announcement

Open window for ventilation

Refraining from talking

Wearing masks



Request to follow measures for prevention infection of Covid-19

JR East implements to open window and activate HVAC for ventilating. If you find closed window, please cooperate to open it.

We ask you to wear masks, refrain from talking, cooperate on off-peak commuting and teleworking.

Important notice for preventing COVID-19 outbreaks.

## Avoid the "Three Cs"!

1. **Closed spaces** with poor ventilation.
2. **Crowded places** with many people nearby.
3. **Close-contact settings** such as close-range conversations.



One of the key measures against COVID-19 is to prevent occurrence of clusters. Keep these "Three Cs" from overlapping in daily life.



In addition to the "Three Cs," items used by multiple people should be cleaned with disinfectant.



From Korail (South Korea):

How to Wear Mask



Caution Wearing Mask



About Droplet infection



- Micro Droplet last more than 20 min and floating

Level of Mask and Proper Mask

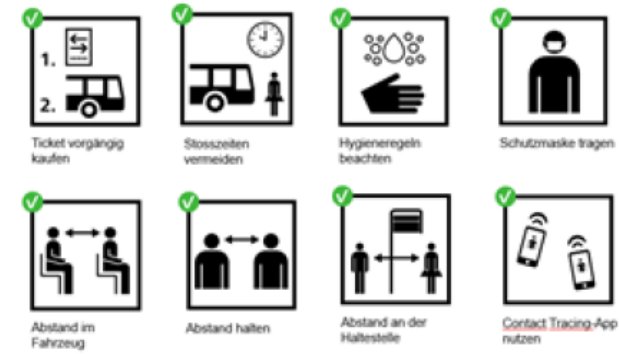


- Example of Mask protection level type which produced in KOR Gov (Density)
- Definition for droplet size 0.4micrometer (different from each country)



From SBB (Switzerland):

Verhaltenstipps: So fahren Sie sicher im ÖV





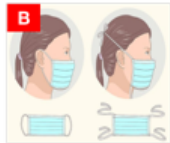
**Wichtige Hinweise:**

- Die Maske nur einmal und für maximal 4 Stunden (auch wenn sie feucht ist) tragen.
- Die Maske unverzüglich wechseln, wenn sie beschädigt ist.
- Gebrauchte Masken nicht reinigen oder lagern, sondern entsorgen.
- Vor und nach dem Aufsetzen/der Entsorgung einer Maske die Hände mit Seife waschen.



Vor dem **Aufsetzen der Maske** die Hände gründlich mit Wasser und Seife waschen und anschließend mit einem sauberen Papiertuch trocknen.

Maske über Nase und Mund legen. Der mit einem Draht verstärkte Teil kommt oben über den Nasenrücken (siehe **Abbildung A**). Achtung: Die Maske ist mit der blauen (farbigen) Seite nach aussen zu tragen.



Gummiband um jedes Ohr platzieren oder zunächst oberes Band hinten am Kopf zusammenbinden (siehe **Abbildung B**).



Unteren Teil der Maske über das Kinn ziehen (siehe **Abbildung C**). Den oberen, verstärkten Teil in die richtige Passform bringen, so dass der Maskenrand überall eng an die Haut anschliesst. Die Maske muss das Gesicht vom Nasenrücken bis unterhalb des Kinns abdecken.



Mit dem Zeigefinger und Daumen den mit einem Draht verstärkten Teil des oberen Maskenrandes um den Nasenrücken herum eindrücken (siehe **Abbildung D**). Bei Maske mit Bändern unteres Band hinten am Ansatz des Hinterkopfes zusammenbinden.



Die **Maske abnehmen**, indem die Schlaufen über den Kopf gezogen werden, ohne die Vorderseite der Maske zu berühren (siehe **Abbildung E**). Die Maske in einen verschlossenen Behälter entsorgen. Die Maske selbst nicht berühren, da sie kontaminiert sein könnte. Nach dem Ablegen der Maske die Hände umgehend waschen.

## Hygienemasken: Anleitung\*

\*Diese Anleitung gilt nicht für Schutzmasken des Typs FFP2/FFP3

## From Eurostar (UK):



Pre-departure with Eurostar: new queue layout and visual guidance for queue distancing



From SNCF (France):

YouTube dedicated videos: [https://youtu.be/u\\_dn6MpbmM8](https://youtu.be/u_dn6MpbmM8)



xxix

Specific communication on ventilation

À BORD DES TRAINS		À BORD DES AUTRES TRAINS	
<b>TGV INOUI ET OUIGO</b>		notamment <b>INTERCITÉS</b>	
Grâce à un système de filtrage et un apport permanent d'air extérieur		Grâce à un apport permanent d'air extérieur	
Toutes les <b>3 min</b>	Toutes les <b>9 min</b>	Toutes les <b>6 min</b>	<b>Aucune</b>
Filtrage de l'air	Renouvellement intégral de l'air	Renouvellement intégral de l'air	accumulation ou stagnation de l'air intérieur

From ONCF (Morocco):



## From Infrabel (Belgium):



### Respect of social distances via computer vision (1)

- Infrabel's IT department has developed a PoC that enables a PC to detect the number of people present in a room and to ensure that social distancing is respected.
- The department in charge of track maintenance has shown interest in this solution for both office space and workshops.



➔ A dozen operational kits have been made available to the target groups since mid-May.



### Respect of social distances via computer vision (2)



Infrabel's IT teams managed to extract the characteristics of a 3D scene using a simple camera (i.e. a 2D image).

The algorithm is then able to analyze a real situation in 3 dimensions which allows to calculate the coordinates of the individuals and thus determine the distance between them.





## 6. CONCLUSION

The coronavirus is primarily transmitted person to person via respiratory spray. Decreasing the germs being transmitted between people is an effective way to decrease the spread of the virus.

While high quality research regarding mask use is limited, all of the data supports mask wearing as a key public health measure to decrease viral spread. As railway undertakings begin resuming services and turn to “new normal” operations, among all measures and all options feasible, practical, and acceptable to staff and passengers to decrease the likelihood of spread from person to person, masks and more generally cloth face coverings are meant to protect other people, including in case the wearer is unknowingly infected but does not have symptoms by wearing a cloth face covering when physical distancing is difficult.

The response to the Covid-19 crisis for the rail sector requires railway undertakers to navigate a changing environment, so UIC invites rail companies to regularly connect to the various dedicated communication channels put in place by the UIC Covid-19 taskforce.

# APPENDIX

## EQUIVALENCE BETWEEN STANDARDS COVERING INDIVIDUAL PROTECTION EQUIPMENT (MASKS)

Equivalence between European standard NF EN 149 : 2001+A1:2009 covering « Appareils de protection respiratoire - Demi-masques filtrants contre les particules -Exigences, essais, marquage» / FP2 and main international norms for FP2 type masks

Equivalence between European standard NF EN 149 : 2001+A1:2009 covering « Appareils de protection respiratoire - Demi-masques filtrants contre les particules -Exigences, essais, marquage» / FFP3 and main international norms for FP3 type masks

30

Country	Standard reference
<b>USA</b>	NIOSH 42 CFR 84/N95, P95 and R95
<b>China</b>	GB2626-2006/KN95 and KP95
<b>New Zealand &amp; Australia</b>	AS/NZS 1716:2012/P2
<b>South-Korea</b>	KMOEL - 2017-64/1st class
<b>Japan</b>	JMHLW-notification 214, 2018/DS2 and DL2
<b>Brazil</b>	ABNT/NBR 13698:2011/PFF2
<b>Mexico</b>	NOM-116-2009/N95, P95 and R95

Country	Standard reference
<b>USA</b>	NIOSH 42 CFR 84/ N99, N100, P99, P100, R99 and R100
<b>China</b>	GB2626-2006/ KN100 and KP100
<b>New Zealand &amp; Australia</b>	AS/NZS 1716:2012/P3
<b>South-Korea</b>	
<b>Japan</b>	JMHLW-notification 214, 2018/DS3 and DL3
<b>Brazil</b>	ABNT/NBR 13698:2011/PFF3
<b>Mexico</b>	NOM-116-2009/ N99, N100, P99, P100, R99 and R100



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#RAILsilence**





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