Webinar on Ventilation and COVID-19 Risk Mitigation in Organisation
Jointly Organised by FMM Institute and Soon Soon Group Malaysia

Sharing our experience in Mitigating COVID-19 in our workplace.

by
Dato' Dr Neoh Soon Bin
Soon Soon Group of Companies

9th September 2021

Sharing our experience in Mitigating COVID-19 in our workplace – essential components

- Setting up a 4 level comprehensive contact tracing program
- Treating the air using increased fresh air change, UVC, Plasmacluster ionizers and HEPA Filters
- How to do risks assessment and how to use RTK Antigen saliva test to minimise risk and cross infection

Agenda

01 COVID-19 Situation in Malaysia getting serious

02 Why we need to have contact tracing

03 How to set up a comprehensive contact tracing system

04 Using Rapid Saliva Antigen Test for early detection and control of COVID-19 in your workplace

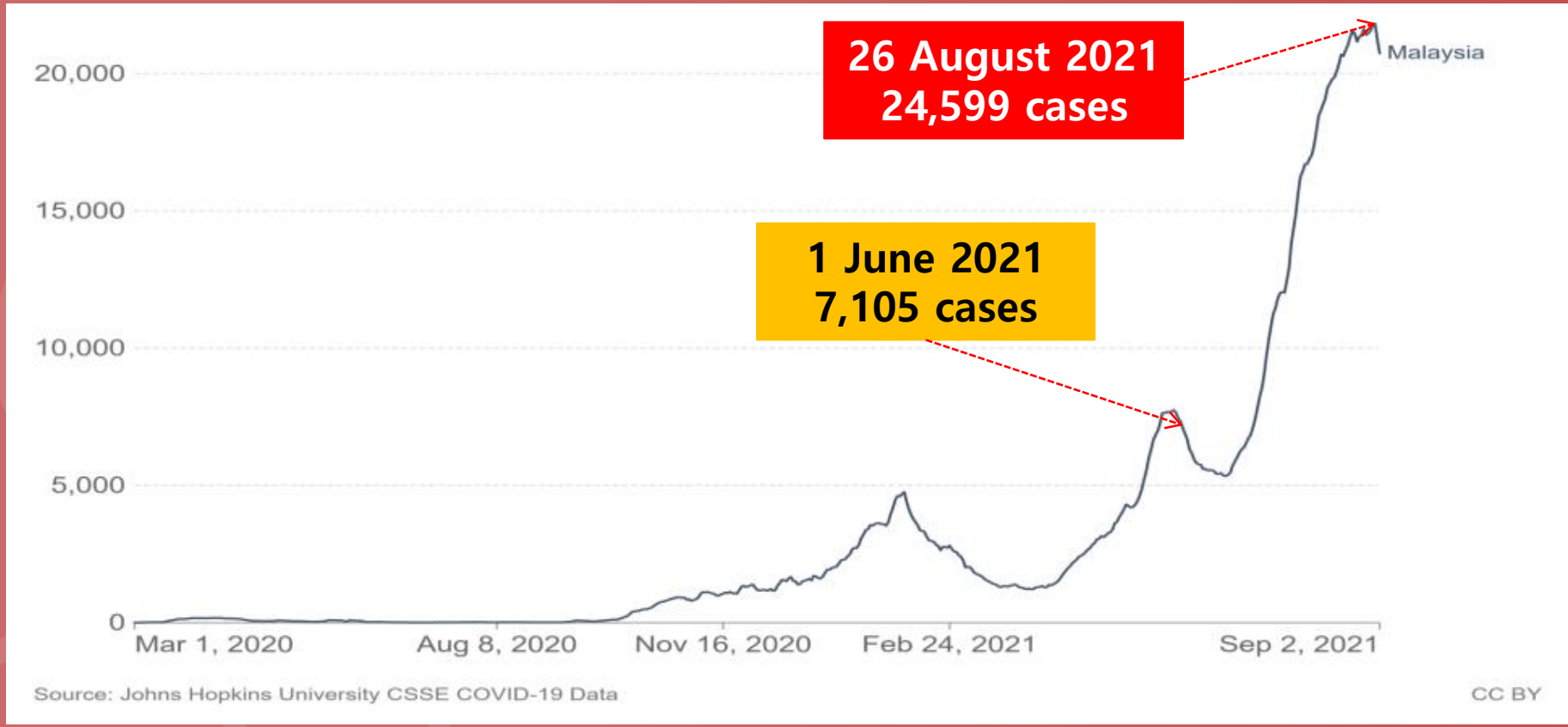
05 Air treatment is crucial – COVID-19 is an air borne disease

06 Take Home Messages

We will make the presentation slides available for downloading
AFTER THE WEBINAR at
http://www.soonsoongroup.com/index.php/our-response-to-covid-19

So **Relax and Concentrate**
on the presentation and
ask as many questions as possible.

COVID-19 situation in Malaysia is getting serious



Statistics of Daily COVID-19 positive cases in Malaysia (March 2020 – Sept 2021)

Clusters from workplace still the highest!

Date	No. of new clusters	No. of workplace clusters	No. of other clusters	Total no. of cases from new clusters	Total No. of cases from workplace clusters	Total No. of cases from other clusters
1/09/2021	42	22	20	1168	673	495
2/09/2021	31	17	14	1149	793	356
3/09/2021	34	20	14	1109	764	345
4/09/2021	16	12	4	569	472	97
5/09/2021	37	21	16	1124	798	326
6/09/2021	30	16	14	1165	725	440
7/09/2021	39	23	16	1358	897	461
Total	229 (100%)	**131 (57%)**	98 (43%)	7029 (100%)	**5122 (67%)**	2520 (33%)

Source: MOH

MCO in place, Fines are High but Why the COVID-19 cases are still high?

MCO	18/3/2020 - 3/5/2020	47 days
CMCO	4/5/2020 - 9/6/2020	37 days
RMCO	10/6/2020 - 13/10/2020	126 days
CMCO	14/10/2020 - 12/1/2021	91 days
MCO 2.0	13/1/2021 - 4/3/2021	51 days
CMCO 2.0	5/3/2021 - 6/5/2021	63 days
MCO 3.0	7/5/2021 - 31/5/2021	25 days
FMCO	1/6/2021 - 28/6/2021*	28 days*

PPN

Fasa 1 Dilanjutkan	June/ July
Fasa 2	July - Aug
Fasa 3	Sept - Oct
Fasa 4	Nov - Dec

Why COVID-19 cases are still high?

Possible reasons

1. New Delta variant 3-4 X more infectious so existing control measures may not be adequate
2. SOP not in place or not being followed strictly
3. Not able to do contact tracing therefore cannot isolate COVID-19 patients and their close contacts
4. Air system not managed properly allowing virus to be spread within the workplace
5. Misconception that vaccination will automatically stop spread. Latest data indicate in real world vaccination can only mitigate 30% of the spread

New Government Direction

"We have to accept the fact that even if we are able to control this pandemic, we will also need to accept the fact that there will come a day when COVID-19 will become endemic and for that matter, we will co-exist with the virus."

Moving forward a more enhanced level of contact tracing become very important.

YB Khairy Jamaluddin
Health Minister
1 Sept 2021

Potential impact of this new government policy changing from pandemic to endemic control

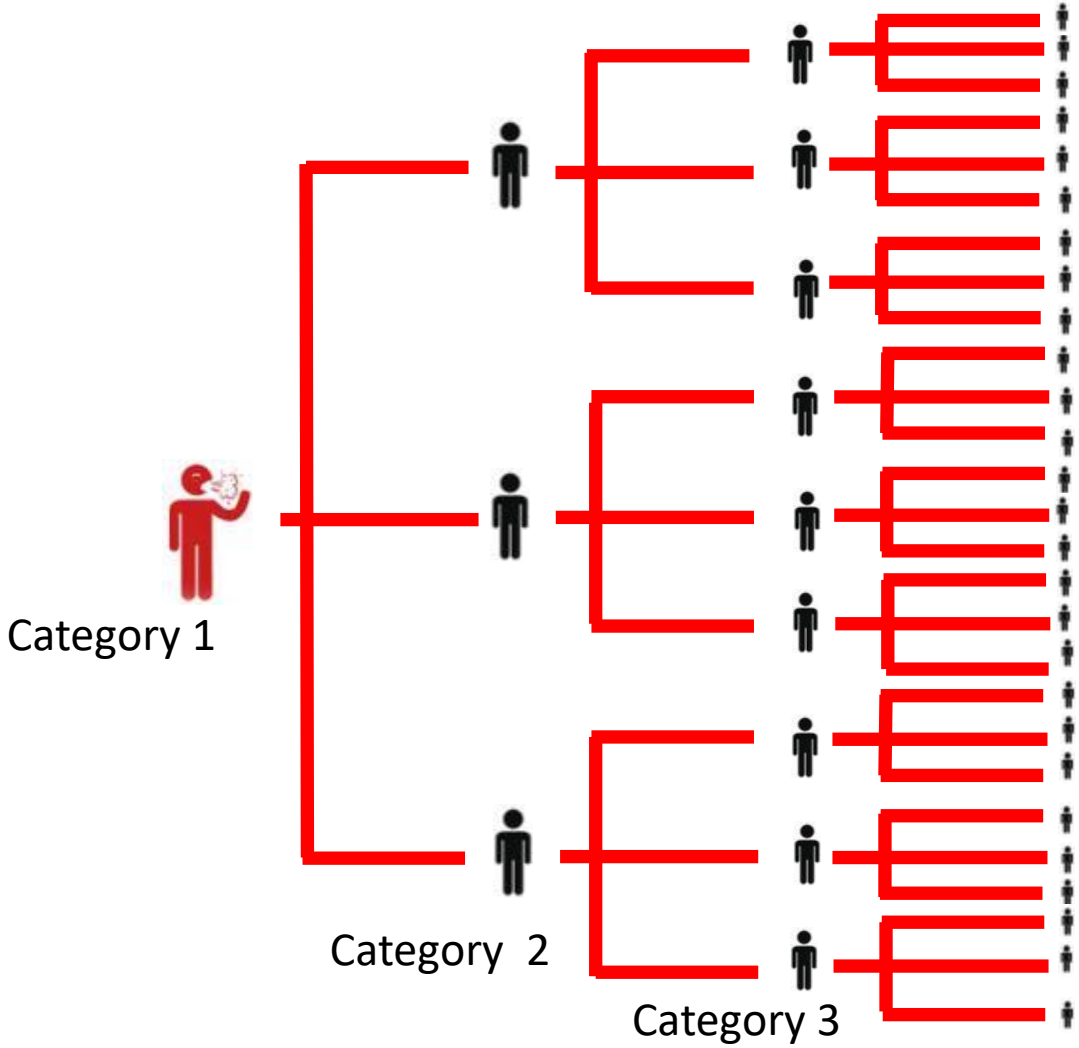
- Government will relax travel restrictions, dining in restaurants, religious institutions, hotels, cinemas, gym etc

- Therefore more likely for your staff to contract COVID-19; however due to vaccination, many may be asymptomatic

- Very likely government will still impose guidelines like quarantine of COVID-19 patients and their close contacts. So if you don't control well, your factory/ office will shut down due to insufficient workers.

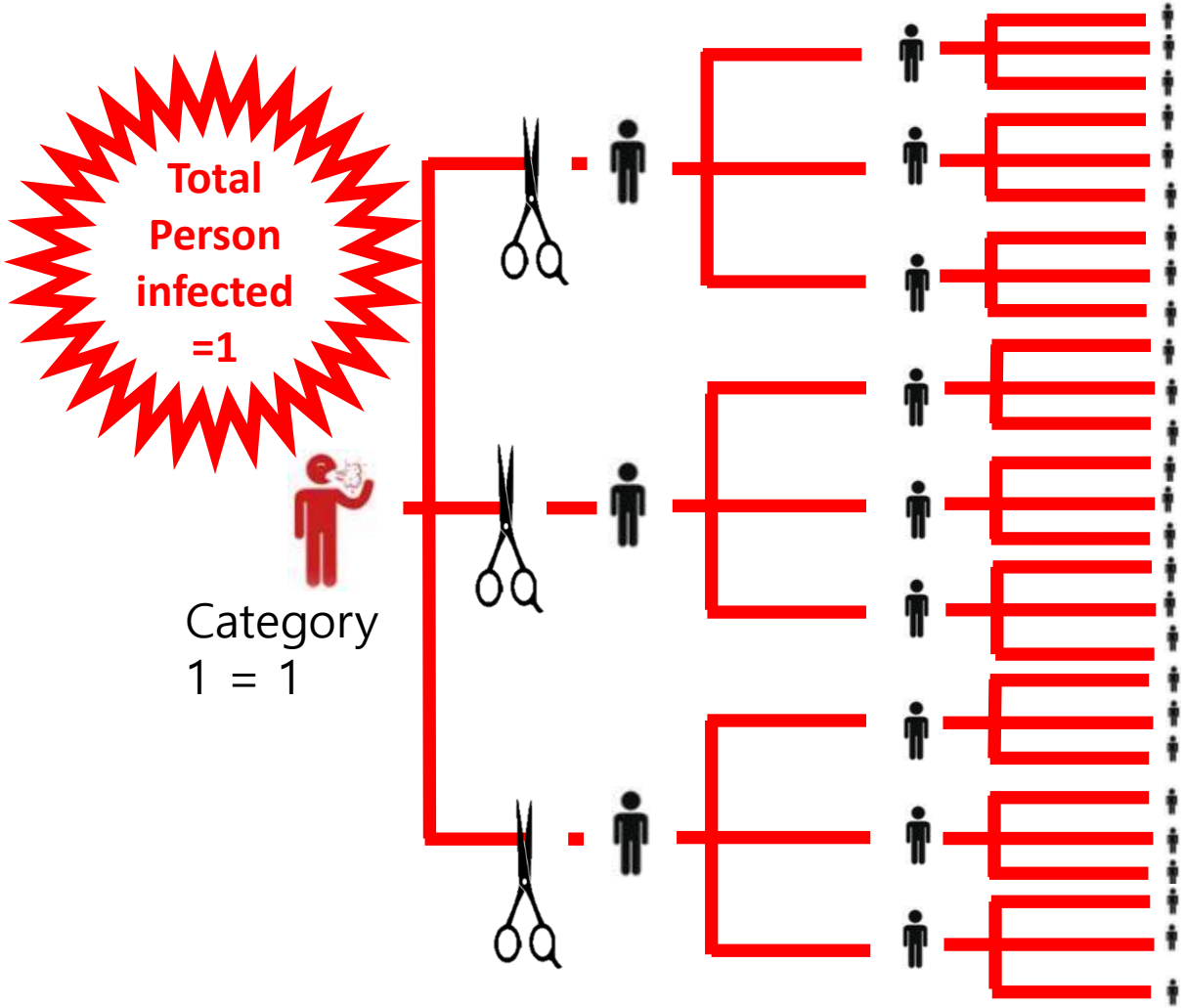
- Therefore your SOP and mitigation programs have to be even better to ensure your operations can continue smoothly without disruptions from COVID-19 clusters forming from your workplace.

Why we need to have Contact Tracing



If not managed, COVID-19 can spread quickly in the workplace

Total 40 persons infected



The only way to prevent COVID-19 from spreading in your workplace is to break the chain of infection from the Category 1 person to Category 2 persons

You must be able to identify the people whom the infected Person (Category 1) is in close contact with in order to prevent the disease from spreading to the Category 2 person. This can be managed by doing a close contact tracing and risk assessment

Most important assumptions

You cannot prevent a COVID-19 positive person from entering your workplace since 80% of younger people do not have symptom or only have mild symptom which does not result in any fever, cough etc. Post vaccination, more infected people will be asymptomatic.

You have to assume that everyone of your staff is a potential COVID-19 spreader and your mitigation program must be able to prevent them from spreading COVID-19 in your work place

Therefore The Most Important Thing Is …

….. to control the spread of COVID-19 in your Workplace.

This can be done by setting up a Close Contact Tracing and having a Risk Assessment Program linked to a Rapid Testing Program and with Proper Management of your Air System

Underlying principles

Understanding the definition of close contact and casual contact

Early identification of close contact is very important to prevent further spreading, to take fast action to contain the problem by proper isolation of the affected people

Early/fast/effective contact tracing is very important to prevent the spread of COVID-19

Who are Close Contacts and Casual Contacts?

MOH defines Close Contacts as the people who are in contact with COVID-19 positive cases in the following situations:

1. Family members in the same house/ working partners in office/ classmates
2. >15 minutes, < 1 metre away distance in a confined space
3. In an office environment like an air-conditioned office or meeting room more than 2 hours.
4. A COVID-19 Passer-by that cause transmission of water droplets (coughing and sneezing & not wearing any mask passing by a healty person).
5. Being together in the same car with distance of less than 2 car seats away

MOH defines Casual Contacts as the people who are in contact with COVID-19 positive cases in the following situations:

1. You are a casual contact if you have been within only 2 meters of someone with COVID-19 for less than 15 minutes.

MOH Guidelines for Close Contact and Casual Contacts

	For Close Contact	For Casual Contact
Quarantine requirement	Yes, 10 days*	No
Risk status	High	Low
Necessity to conduct COVID-19 testing	Yes, on the 1st and 8th day For Greater Klang Valley, only test when symptoms developed	No, unless there is symptoms
Status if tested positive	Status become COVID-19 positive	Status become COVID-19 positive
Status if tested negative	Remain as close contact and need to be quarantined for 10 days*	Remain as casual contact but do not need to be quarantined
Self Health Assessment	To be continued for another 14 days	To be continued for another 14 days

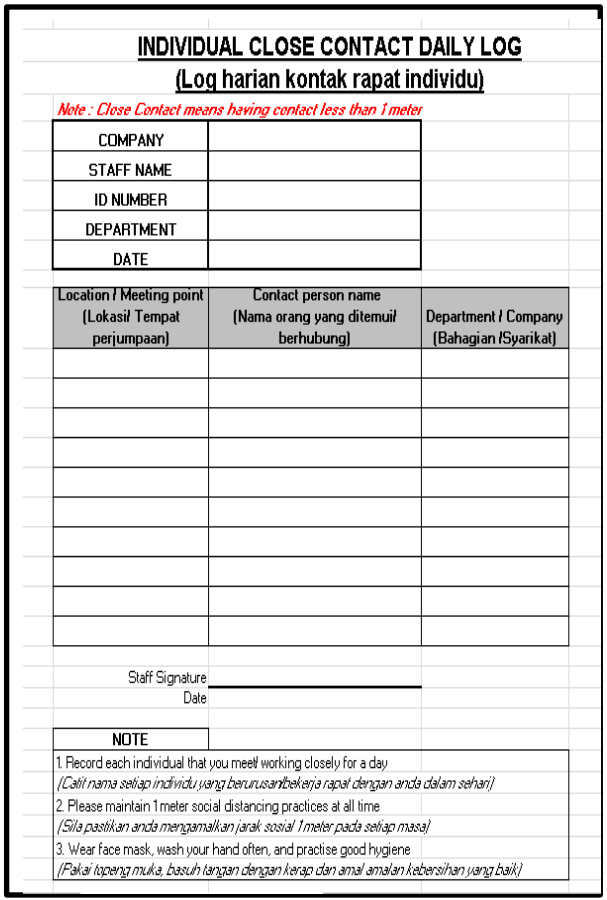
* Annex 12 dated 13/8/21

Employer's Role

1. All costs of testing and managing employees are to be borne by the employer.
2. Employers are to assist in notification of cases and contacts via the Excel sheet formats provided by the nearest Pejabat Kesihatan Daerah (PKD).
3. Employer is to ensure all positives remain isolated at their quarantine location for a period of 10 days and until they receive a rele ase order.
4. Employer is to identify close contacts at work and ensure they adhere to the home surveillance order, before they are allowed to return to work.
5. Employer is to assist in monitoring the health of the workers on isolation/home surveillance.
6. Employer is to ensure a suitable premise for the isolation of positives or home surveillance of close contacts.
7. Employer to provide support for the provision of necessary essentials for employees under home isolation/ surveillance including the provision of the pulse oximeter.
8. Employer must ensure ventilation systems adhere to the requirement of the Guidance Note on Ventilation and Indoor Air Quality by the Department of Occupational Safety and Health (DOSH) attached herewith marked as Appendix A.

How to set up a comprehensive Contact Tracing Program

Individual Close Contact Daily Log



INDIVIDUAL CLOSE CONTACT DAILY LOG
(Log harian kontak rapat individu)

Note : Close Contact means having contact less than 1 meter

COMPANY	
STAFF NAME	
ID NUMBER	
DEPARTMENT	
DATE	

Location / Meeting point (Lokasi/ Tempat perjumpaan)	Contact person name (Nama orang yang ditemui/ berhubung)	Department / Company (Bahagian /Syarikat)

Staff Signature _____
Date

NOTE
1. Record each individual that you meet/ working closely for a day
(Catit nama setiap individu yang berurusan/bekerja rapat dengan anda dalam sehari)
2. Please maintain 1 meter social distancing practices at all time
(Sila pastikan anda mengamalkan jarak sosial 1 meter pada setiap masa)
3. Wear face mask, wash your hand often, and practise good hygiene
(Pakai topeng muka, basuh tangan dengan kerap dan amal amalan kebersihan yang baik)

List down your close contact for the day

Who are your close contact list?

1. < 1 meter and/or talk >15 mins

2. Same room > 2 hours

Record their names and where you meet them

Once anyone in the company becomes Category 1 or 2, we need to retrieve the 14 days records of the individuals. After that, a risk assessment will be conducted.

Note: You can download Individual Close contact Daily log from website
http://www.soonsoongroup.com/index.php/our-response-to-covid-19

Example of completed Individual Close Contact Daily Log for the day

INDIVIDUAL CLOSE CONTACT DAILY LOG
(Log harian kontak rapat individu)

Note : Close Contact means having contact less than 1 meter

COMPANY	SSOM
STAFF NAME	KHAW
ID NUMBER	7193
DEPARTMENT	PD
DATE	09/02/2021

Location / Meeting point (Lokasi/ Tempat perjumpaan)	Contact person name (Nama orang yang ditemui/ berhubung)	Department / Company (Bahagian /Syarikat)
FOOD LAB	LIEW	PD
FOOD LAB	ONG	PD
FOOD LAB	NG	PD
SSLAB	DARUN	SSLAB
FOOD LAB	WAN	Flourmill

Staff Signature _____

Date 09/02/2021

NOTE

1. Record each individual that you meet/ working closely for a day
(Catit nama setiap individu yang berurusan/bekerja rapat dengan anda dalam sehari)
2. Please maintain 1 meter social distancing practices at all time
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FOOD LAB	WAN	Flourmill

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(Pakai topeng muka, basuh tangan dengan kerap dan amal amalan kebersihan yang baik)

Soon Soon Close Contact Tracing Process Flow

When spouse/ family member is found to be COVID-19 positive

When worker has COVID-19 symptoms

Staff being notified as close contact by family/friend/MOH or being tested positive

Staff immediately inform HOD

HOD retrieve close contact log form for the past 14 days

HOD interview close contact workers & fill in the close contact tracing and risk assessment form (Identification and tracing of close contacts Cat 2, Cat 3 and Cat 4)

Note:
You can download Individual Close contact Tracing & Risk Assessment form from website
http://www.soonsoongroup.com/index.php/our-response-to-covid-19

Ref : MOH Covid Portal - Infografik KKM Jan 2021

Soon Soon Management of Close Contact

Person of Category 1

Notify Status via MySJ app immediately (Testing Lab/Self update). Inform HOD.

HR to notify case and close contacts via excel sheet formats to PKD

Immediately self isolate & perform Home Assessment Tool (HAT) in MySJ.

Digital Home Surveillance Order will be received via MySJ.

Follow SS protocol. Update daily health condition (HAT) in MySJ and to section HOD

Any symptoms developed during quarantine

No → Resume work after completed 10 days quarantine (retesting not required)

Yes

Contact or Go to nearest CAC

Continue home quarantine?

No → Admission to PKRC / Hospital (arrangement by CAC)

Yes

Virtual assessment conducted by the CAC

Restart 10 days quarantine. If severe symptoms seek medical attention immediately or call 999

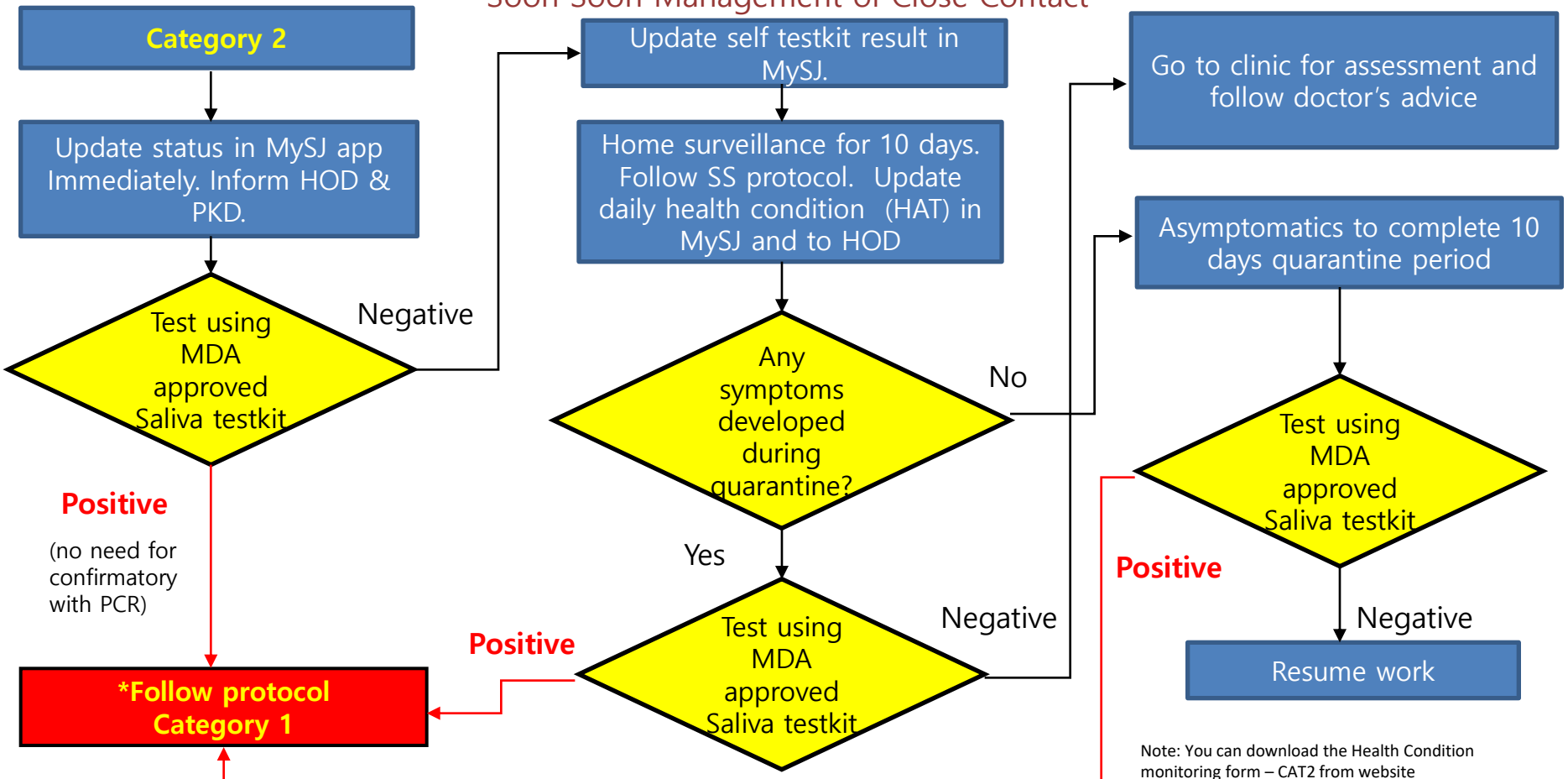
Resume work after completed 10 days quarantine after symptoms onset (retesting not required)

Important note : Testing should not be carried out for positives who are within 3 months of recovery unless symptomatic

Note:
CAC: COVID-19 Assessment Centre

Note:
You can download the Health Condition monitoring form- CAT 1 from website
http://www.soonsoongroup.com/index.php/our-response-to-covid-19
Ref : Annex 14c - Home Assessment Tool for Covid 19 patient

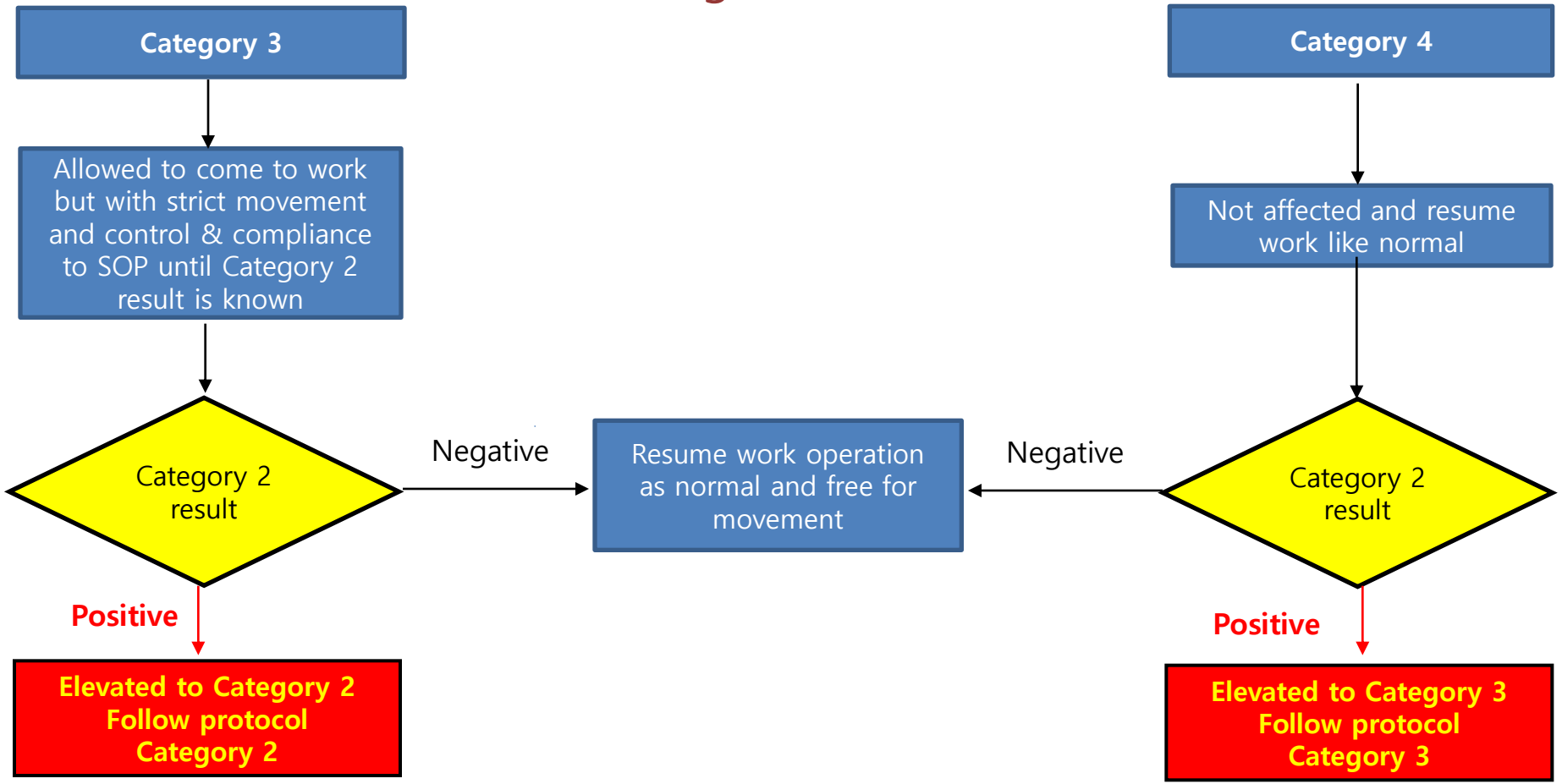
Soon Soon Management of Close Contact*



Note: You can download the Health Condition monitoring form – CAT2 from website http://www.soonsoongroup.com/index.php/our-response-to-covid-19

Ref : Annex15- Daily Surveillance For Covid 19 Close contacts

Soon Soon Management of Close Contact

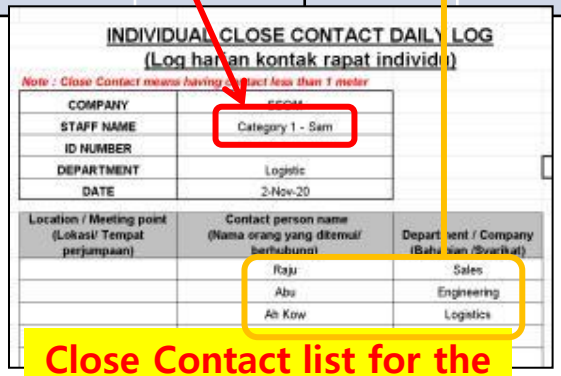


Soon Soon Close Contact Tracing and Risk Assessment Protocol

Category 1 (positive)		Category 2 (close contact with 1)			Category 3 (close contact with 2)			Category 4 (close contact with 3)		
Name	Work Area/ Dept	Name	Work Area/ Dept	Rationale of Inclusion	Name	Work Area/ Dept	Rationale of Inclusion	Name	Work Area/ Dept	Rationale of Inclusion
HOME QUARANTINE IF NO/ OR MILD SYMPTOMS	FOLLOW THE QUARANTINE INSTRUCTION BY MOH	HOME SURVEILLANCE 10 DAYS, DO RTK ANTIGEN TEST (SALIVA)	Cat 2 +ve	MOVE TO CATEGORY 1	CAN WORK MUST BE LIMITED IN MOVEMENT WITH STRICT CLOSE CONTACT SOPs UNTIL CATEGORY 2 RESULT IS KNOWN	Cat 2 +ve	MOVE TO CATEGORY 2	CONTINUE TO WORK	Cat 2 +ve	MOVE TO CATEGORY 3
QUARANTINE IN HOSPITAL OR QUARANTINE CENTRE IF INSTRUCTED BY MOH			Cat 2 -ve	CONTINUE HOME SURVEILLANCE TO COMPLETE 10 DAYS QUARANTINE		Cat 2 -ve	CONTINUE TO WORK		Cat 2 -ve	CONTINUE TO WORK

How do we complete the Contact Tracing and Risk Assessment Protocol

Category 1 (positive)		Category 2 (close contact with 1)			Category 3 (close contact with 2)			Category 4 (close contact with 3)		
Name	Work Area/Dept	Name	Work Area/ Dept	Rationale Of inclusi on	Name	Work Area/Dept	Rationale Of inclusi on	Name	Work Area/Dept	Rationale Of inclusi on
Sam	Logistic	Raju	Sales	Close Contact list for the last 14 days	Linda	Sales	Close Contact list for the last 14 days	Ali	Sales	
		Abu	Engineering		Fauzi	Procurement		Siti	Sales	
		Ah Kow	Logistics		Christina	IT		George	HR	


INDIVIDUAL CLOSE CONTACT DAILY LOG
(Log harian kontak rapat individu)

Note : Close Contact means having contact less than 1 meter

COMPANY	SSOM
STAFF NAME	Category 1 - Sam
ID NUMBER	
DEPARTMENT	Logistic
DATE	2-Nov-20

Location / Meeting point (Lokasi/ Tempat perjumpaan)	Contact person name (Nama orang yang ditemui/ berhubung)	Depart ent / Company (Bahagian /Syarikat)
	Raju	Sales
	Abu	Engineering
	Ah Kow	Logistics

Close Contact list for the last 14 days


INDIVIDUAL CLOSE CONTACT DAILY LOG
(Log harian kontak rapat individu)

Note : Close Contact means having contact less than 1 meter

COMPANY	SSOM
STAFF NAME	Category 2 - Raju
ID NUMBER	
DEPARTMENT	Sales
DATE	2-Nov-20

Location / Meeting point (Lokasi/ Tempat perjumpaan)	Contact person name (Nama orang yang ditemui/	Depart ment / Company
	Linda	Sales
	Fauzi	Procurement
	Christina	IT

Close Contact list for the last 14 days

To continue tracing until Cat.4

How do we complete the Contact Tracing and Risk Assessment Protocol

In the event **Raju has been tested positive**

Close contacts of Raju – Linda, Fauzi & Christina, will be **escalated to Category 2**

Close contacts of Linda Fauzi & Christina (Ali, Siti & George) will be **escalated to Category 3**

Category 1 (positive)		Category 2 (close contact with 1)			Category 3 (close contact with 2)			Category 4 (close contact with 3)		
Name	Work Area/ Dept	Name	Work Area/ Dept	Rationale Of inclusion	Name	Work Area/ Dept	Rationale Of inclusion	Name	Work Area/ Dept	Rationale Of inclusion
Sam	Logistic	Raju	Sales	Close Contact list for the last 14 days	Linda	Sales	Close Contact list for the last 14 days	Ali	Sales	
		Abu	Engineering		Fauzi	Procurement		Siti	Sales	
		Ah Kow	Logistics		Christina	IT		George	HR	

Category 1 (positive)		Category 2 (close contact with 1)			Category 3 (close contact with 2)			Category 4 (close contact with 3)		
Name	Work Area/ Dept	Name	Work Area/ Dept	Rationale Of inclusion	Name	Work Area/ Dept	Rationale Of inclusion	Name	Work Area/ Dept	Rationale Of inclusion
Sam	Logistic	Abu	Engineering		Ali	Sales		Lucy	Marketing	
Raju	Sales	Ah Kow	Logistics		Siti	Sales		Ah Meng	Finance	
		Linda	Sales		George	HR		Nanda	Production	
		Fauzi	Procurement							
		Christina	IT							

He will be **escalated to Category 1**

New tracing for close contact of Ali, Siti & George to be in Category 4

To continue tracing until Category 4

Strategy on Minimizing Close Contact

- All close contact of positive cases have to be quarantined for 10 days.

- Therefore minimizing the number of close contacts to your potential positive cases are important eg follow MOH principles of Follow 3W, Avoid 3C etc

- In the event, there are any positive cases, the number of people required to be quarantined cases can be minimized

Using Rapid Saliva Antigen Test for early detection and control of COVID-19 in your workplace

Types of COVID-19 Tests

	RT-PCR (Reversed Trancription Polymerase Chain Reaction)	RTK-Antigen Test (Rapid Test Kit Antigen Test)	Antibody Test
What it is	Test to show if a person has is having or had infection	Test to show if a person is having active infection NOW	Test to show if a person has had an infection in the past BUT it does not tell you whether you have active infection NOW
What it detects	Virus's genetic material	Specific protein from virus	Antibody in the person's immune system
How sample is taken	Nasal or throat swab/saliva	Nasal or throat swab/ saliva	Blood test (finger prick or blood draw)
Time taken to get results	Same day – 1 week	15-30 min	Same day, or a few days
Accuracy and limitations	Typical high accuracy but likely to give false positive if use to test recovered COVID-19 patients because they still has viral debris	Usually high accuracy but false negative can occur especially for asymptomatic patients	Sometimes a second test is required for accurate results. Can be used for mass screening of exposure to COVID-19

Adopted from US FDA

MOH Strategies for managing COVID-19 in the Industries

COVID-19 Screening

Symptomatic

Only symptomatic persons are to be tested

Surveillance

Asymptomatic close contacts do not require testing but need to be placed on home surveillance

Screening

Screening is to be carried out using only Medical Device Authority approved Saliva Test Kits or existing testing processes

Confirmatory Test

There is no need for a confirmatory PCR to be carried out for RTK Ag positive cases during this crisis

3 Months

Testing should not be carried out for positives who are within 3 months of recovery unless symptomatic

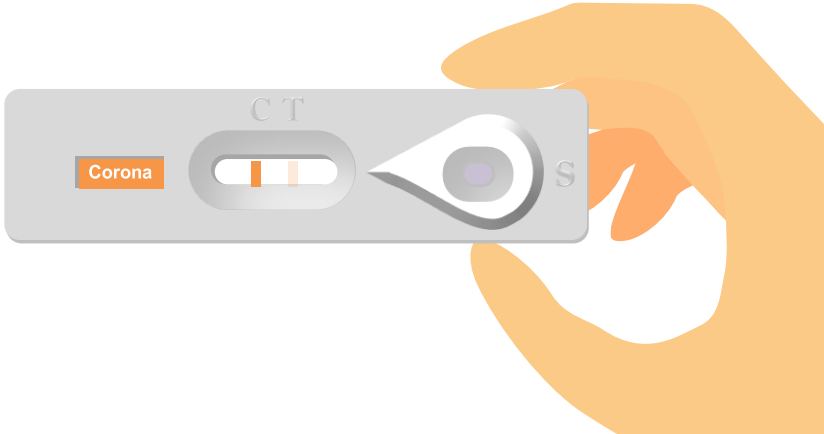
Gate Keeping

Temperature and symptom screening must be carried out daily at the premise entrance including COVID-19 risk status in MySejahtera

Why do we need in-house Rapid COVID-19 Test?

- Due to the high number of Covid-19 cases, time taken to obtain the test is slow/delayed. This may cause the virus to spread while waiting for the test results causing the company to close.

- The new Delta variant incubation time is shorter and more infectious therefore we need to have faster response and testing.



CT Value

PATHOLOGY REPORT

SCAN HERE

Patient Name : [redacted]
Identification : [redacted]
Date of Birth : 07/01/1970 Refer/Policy No :
Age / Gender : 51 year/old - Female Barcode : D55210453
Doctor's Name : DR HEMALA A/P MUNIANDI Visit Id : EC38620116
Client Name : D2U01008

Receiving Branch : DC Bayan Lepas
Collected : 25/08/2021 11:10 AM
Received : 25/08/2021 09:04 PM
Report ready :26/08/2021 06:46 AM

Specimen : Oropharyngeal + Nasopharyngeal Swab

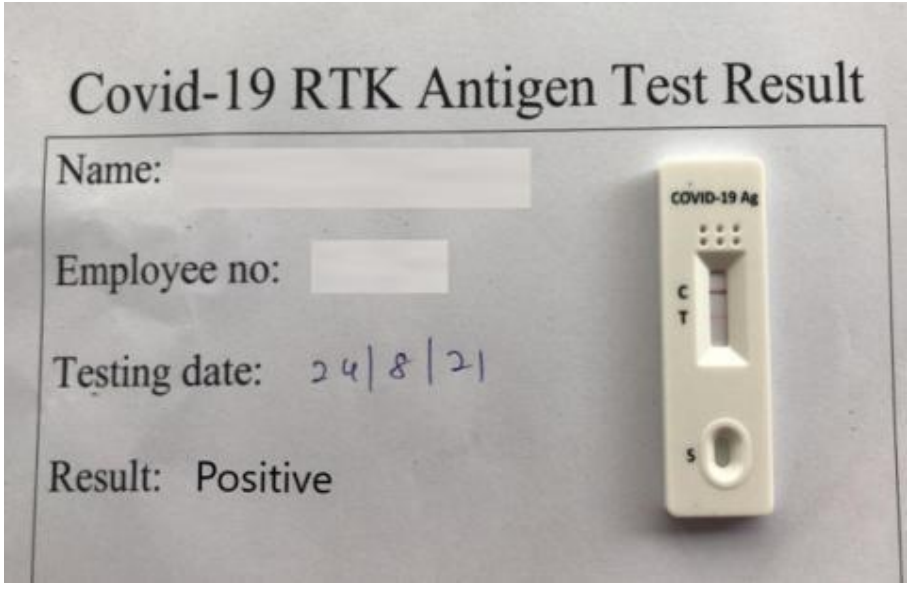
TEST NAME	RESULT	FLAG	UNIT	REFERENCE NOTE
MOLECULAR TESTING (Viral Transport Media)				
COVID-19 Screening (SARS-CoV-2 RT-PCR)				
Result	**Detected**			
Sample transport condition	In ice			
CT Value (RdRp gene)	21.00			
CT Value (E gene)	19.54			
Comment	The result above is based on qualitative screening of viral nucleic acid (E, N and RdRp/S or Orflab genes) for SARS-CoV-2 (Real Time RT-PCR). CT Value for Not Detected is >40, and CT Value for Detected is <40			

Validated By : Suhaina Nashath Binti Mohamed Iqbal - BP Clinical Lab Sdn Bhd (Glenmarie)

Final Report Verified By : Loh Leh Ming - BP Clinical Lab Sdn Bhd (Glenmarie)

END OF REPORT

For further confirmation,please repeat test with another fresh specimen, if desired.
Should you have further enquiries, please contact your nearest BP branch or mail us at bpbq@bphealthcare.com
BP Healthcare Group @ Glenmarie, Temasya @ Glenmarie, Jalan Pendaftar U1/54, Section U1, Shah Alam, Selangor, Malaysia



CT Value

PATHOLOGY REPORT

SCAN HERE

Patient Name : [redacted]
Identification : [redacted]
Date of Birth : 08/01/1991 Refer/Policy No :
Age / Gender : 30 year/old - Male Barcode : DD213870
Doctor's Name : DR PUSHPA Visit Id : EC3825363
Client Name : KLINIK PUEDELA SDN BHD - CO-BM39

Receiving Branch : Bukit Mertajam
Collected : 25/08/2021 04:15 PM
Received : 26/08/2021 01:52 AM
Report ready :26/08/2021 10:12 AM

Specimen : Oropharyngeal + Nasopharyngeal Swab

TEST NAME	RESULT	FLAG	UNIT	REFERENCE NOTE
MOLECULAR TESTING (Viral Transport Media)				
COVID-19 Screening (SARS-CoV-2 RT-PCR)				
Result	Detected			
Sample transport condition	In ice			
CT Value (RdRp gene)	24.83			
CT Value (E gene)	22.82			
Comment	The result above is based on qualitative screening of viral nucleic acid (E, N and RdRp/S or Orflab genes) for SARS-CoV-2 (Real Time RT-PCR). CT Value for Not Detected is >40, and CT Value for Detected is <40			

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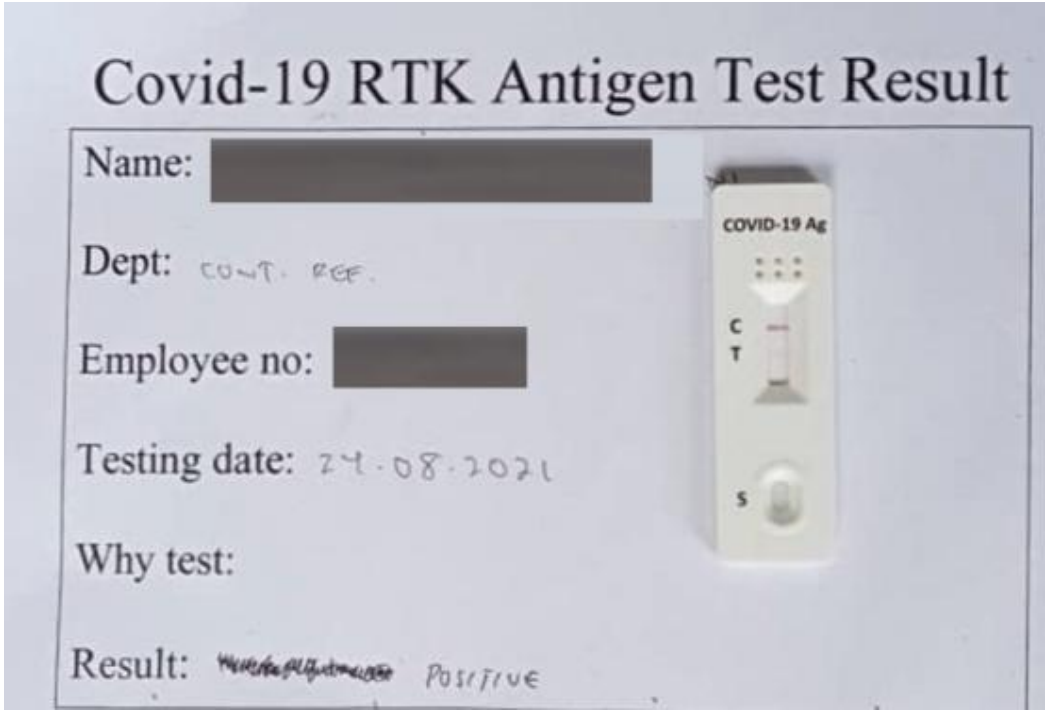


RTK Antigen Test Kits

Brand	Salixium	Gmate	BERIGHT (All Test)
			
Origin	Malaysia	Korea	China
Manufacturer	Reszon Diagnostics International Sdn Bhd, Malaysia	Philosys Co., Ltd, Korea	Hangzhou AllTest Biotech Co., Ltd
Detection	SARS-CoV-2 Antigen	SARS-CoV-2 Antigen	SARS-CoV-2 Antigen
Sample	Saliva/ Nasal	Saliva	Saliva
Sensitivity	91.23%	91.00%	93.30%
Specificity	100.0%	100.0%	100.00%

Covid-19 Self Test Kit Approved by MOH

NO	COMPANY NAME	PRODUCT NAME	MANUFACTURER	IDENTIFIER	DETECTION	SAMPLE TYPE
1	Reszon Diagnostic International Sdn Bhd	Salixium-COVID-19 Rapid Antigen Rapid Test (Saliva/ Nasal Swab Samples)	Reszon Diagnostics International Sdn Bhd. selangor, Malaysia	SLXHB1-0621001	RTK-Antigen (Self-test)	Saliva and nasal swab samples (Mix Samples)
2	Citymedic Sdn Bhd	Gmate® COVID-19 Ag Saliva for Home Use	Philosys Co., Ltd, Republic of Korea	AG-020	RTK-Antigen (Self-test)	Saliva
3	Medinics (M) Sdn Bhd	BERIGHT-COVID-19 Antigen Rapid Test Device (Oral Fluid)	Hangzhou AllTest Biotech Co., Ltd. Zheijang, P.R. China	ICOV-802H	RTK-Antigen (Self-test)	Saliva
4	Global Science Sdn Bhd	ALLTest COVID-19 Antigen Rapid Test (Oral Fluid)	Hangzhou AllTest Biotech Co., Ltd Zheijang, P.R. China.	ICOV-802H	RTK-Antigen (Self-test)	Saliva
5	Neopharma Biotech Asia Sdn Bhd	JusChek COVID-19 Antigen Rapid Test (Oral Fluid)	Hangzhou AllTest Biotech Co., Ltd Zheijang, P.R. China.	ICOV-802H	RTK-Antigen (Self-test)	Saliva
6	Jingga Anggun Sdn Bhd	Longsee 2019-nCoV Ag & Influenza A/B Rapid Co-Detection Kit (Immunochromatography) Home based Use	Guangdong Longsee Biomedical Co. Ltd.,Guangzhou,P.R. China	LS-C-T-005	RTK-Antigen (Self-test)	Saliva
7	Hexamine Sdn Bhd	Sichuan Xincheng SARS-CoV-2 Antigen Assay	Sichuan Xincheng Biological Co. Ltd., P.R. China.	T4001W	RTK-Antigen (Self-test)	Nasal swab
8	Translab (M) Sdn Bhd	Flowflex™ SARS-CoV-2 Antigen Rapid Test (Self-testing)	ACON Biotech (Hangzhou) Co., Ltd., P.R.China	L031-118M5	RTK-Antigen (Self-test)	Nasal swab

Covid-19 Self Test Kit Approved by MOH

9	Neoscience Sdn Bhd	STANDARD™ Q COVID-19 Ag Saliva Home Test	SD Biosensor, Inc. Republic of Korea	Ref No: Q-NCOV-02G Cat. No: 09COV131	RTK-Antigen (Self-test)	Saliva
10	Medical Innovation Ventures Sdn Bhd	ProDetect™ COVID-19 Antigen Rapid Self-Test (Saliva)	Medical Innovation Ventures Sdn Bhd, Penang, Malaysia	PR-CVDCAgS	RTK-Antigen (Self-test)	Saliva
11	Dewina Consult Sdn Bhd	NEWGENE Bioengineering COVID-19 Antigen Detection Kit	New Gene (Hangzhou) Bioengineering Co., Ltd. P.R. China	COVID-19-NG08	RTK-Antigen (Self-test)	Saliva or Nasal swab
12	Tree Med Sdn Bhd	Lituo COVID-19 Antigen Detection Kit (Colloidal Gold) Self Test Kit	Zhuhai Lituo Biotechnology Co., Ltd. P. R. China	LCV051	RTK-Antigen (Self-test)	Saliva
13	Pahang Pharmacy Sdn Bhd	GRUENBANKA SARS-CoV-2 Antigen Detection Kit (Colloidal Gold Method)	Ningbo Lvtang Biotechnology Co. Ltd., Zhejiang P.R, China.	JQ-nCovAg-S	RTK-Antigen (Self-test)	Saliva
14	Malaysian Diagnostics Corporation Sdn Bhd	Humasis COVID-19 Ag Home Test (Self-Test)	Humasis Co. Ltd., Republic of Korea.	ACOVAGS-7025	RTK-Antigen (Self-test)	Nasal swab
15	Teda Wellness Solutions Sdn Bhd	LYHER® Novel Coronavirus (COVID-19) Antigen Test Kit (Colloidal Gold)	Hangzhou Laihe Biotech Co. Ltd. Zheijang, P.R. China	30306	RTK-Antigen (Self-test)	Nasal swab
16	N.A.Z. Medical Supplies Sdn Bhd	ALLTEST COVID-19 Antigen Rapid Test (Oral Fluid)	Hangzhou Alltest Biotech Co., Ltd.Hangzhou,P.R.China.	ICOV-802H	RTK-Antigen (Self-test)	Saliva

Updated 3 September 2021

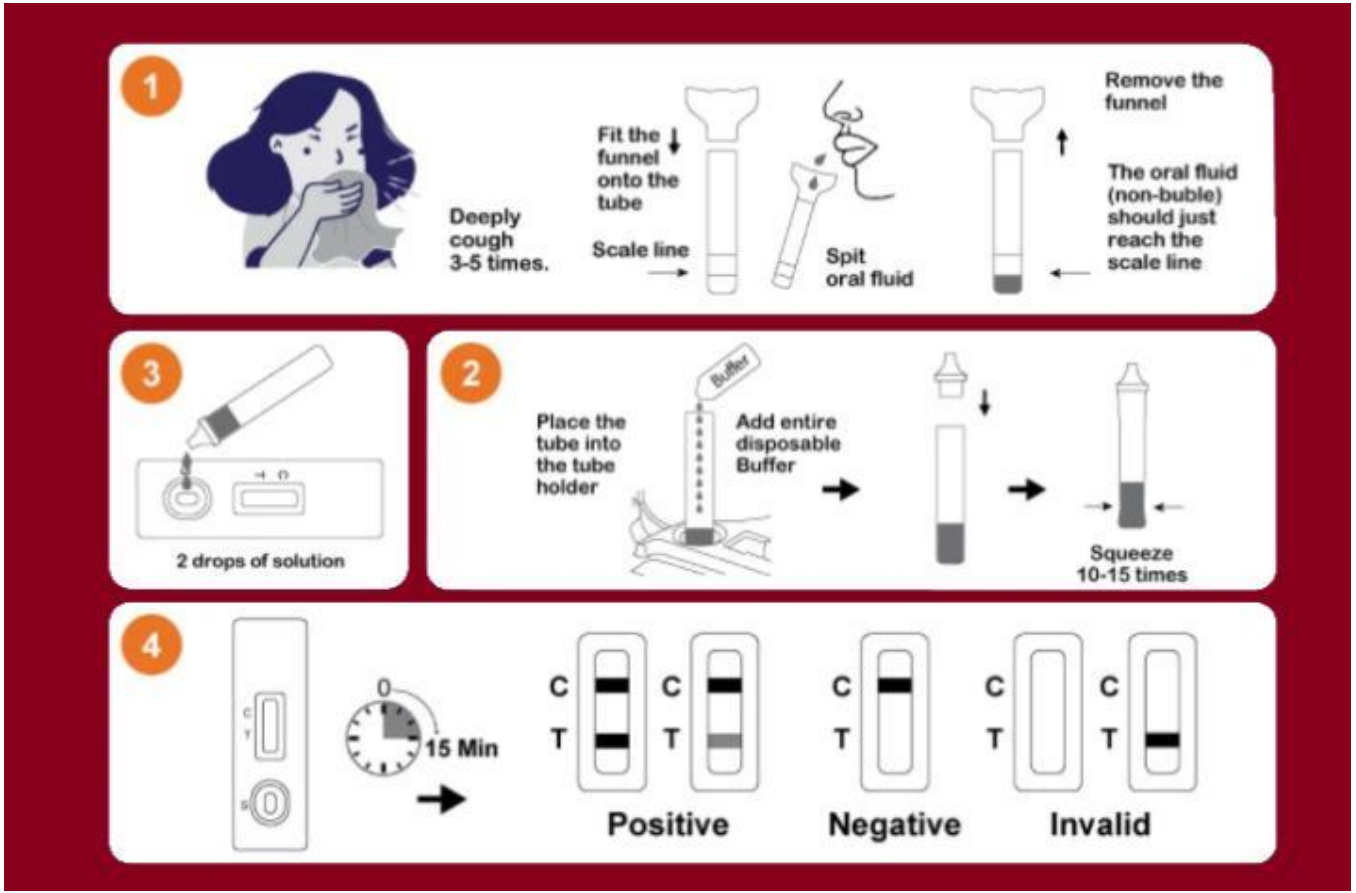
Rapid Antigen Test Method

RTK Antigen Saliva-based test is a rapid test to detect SARS-CoV-2 virus present in human saliva

This rapid method is

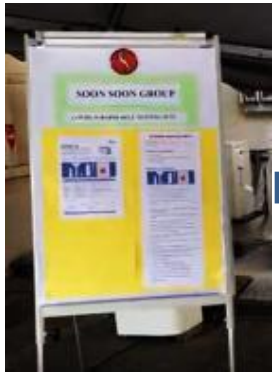
- User friendly – Simpler sample collection with with less training required
- Fast (about 15 minutes)
- Safer – self administered

Rapid Antigen Test Method



Self-administrating test method from preparation, sample Collection & diagnosis

Our In-house Rapid COVID-19 Test Stations



Our In-house Rapid COVID-19 Test Stations

It is important to have multi test stations especially in big factories and should the need arises

Advantages of using RTK Antigen Self-Test Kit

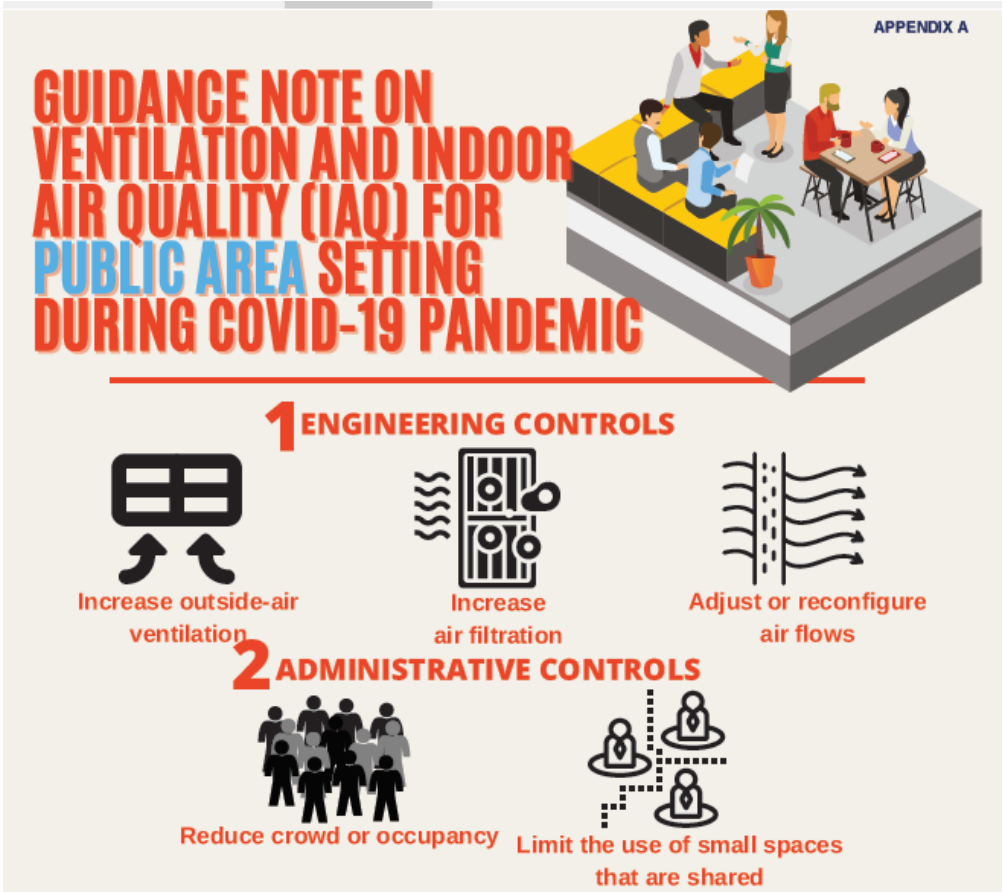
i. Symptomatic cases in the workplace can be detected earlier

ii. Limit the spread of COVID-19 by identifying positive symptomatic cases and take the appropriate measures.

iv. Report to MOH immediately via MySejahtera

Air Treatment is crucial –
COVID 19 is an airborne disease

MOH Guidance on improving Ventilation and Indoor Air Quality in buildings (27 August 2021)



Ventilation is a process in which 'clean' air (normally outdoor air) is intentionally provided to a space and stale air is removed.

(Air infiltration and Ventilation Centre, International Energy Agency)

- Natural air can be used for ventilation but in situation that does not permits, engineering controls can be used.
- Another way of improving ventilation is using administrative control by reducing occupancy

MOH Guidance on improving Ventilation and Indoor Air Quality in buildings (27 August 2021)

- Partitions can help too.

- Cleaning and Disinfections

Time lapse since confirmed COVID-19 case	Cleaning	Disinfection
<24hrs	Yes	Yes
24hrs to 3 days	Yes	No*
>3 days	No	No

* Yes if there is high index transmission

MOH Guidance on improving Ventilation and Indoor Air Quality in buildings (27 August 2021)

5 MEASURES FOR AIR-CONDITIONED PREMISES WITH MECHANICAL VENTILATION AIR CONDITIONING (MVAC)

- Ensure MVAC system are fully functioning.
- Maximise ventilation for indoor air dilution.
- Maximise outdoor air intake and supply by setting.
- Minimise indoor air recirculation; use high-efficiency filters in AHUs to treat recirculated air

6 MEASURES FOR NATURALLY VENTILATED PREMISES

- Improve ventilation, consider adding window or wall mounted exhaust fans.
- Improve air supply and increase ventilation rate.

7 MEASURES FOR ENCLOSED AIR-CONDITIONED PREMISES WITHOUT MECHANICAL VENTILATION PROVISION

- Increase ventilation and air exchange rate.
- Install window-mounted exhaust fans.
- Use portable air cleaner in enclosed space.
- Ensure there are no leakage of air into any occupied space.

Portable air cleaner

Different recommendations for ventilation:

1. Premises with mechanical ventilation air-conditioning (MVAC)

2. Premises with natural ventilation

3. Premises without mechanical ventilation/ Enclosed air-conditioned premises

Overview of our air treatment protocol

AIR QUALITY TARGETS:

- Total fresh air change min 2X/hr
- CO_2 800ppm max
- Plasmacluster ions 1000-3000 ions/cm^3
- Extra HEPA filters in small rooms

Our Protocol for office with centralized air con

- Fresh air change 2.5X/ hr
- Plasmacluster ions 1500 ions/cm^3

  Will increase to 3000 ions/cm^3
- UVC treatment of returned air
- Extra HEPA filters in small rooms

Our Protocol for Enclosed spaces using split cons

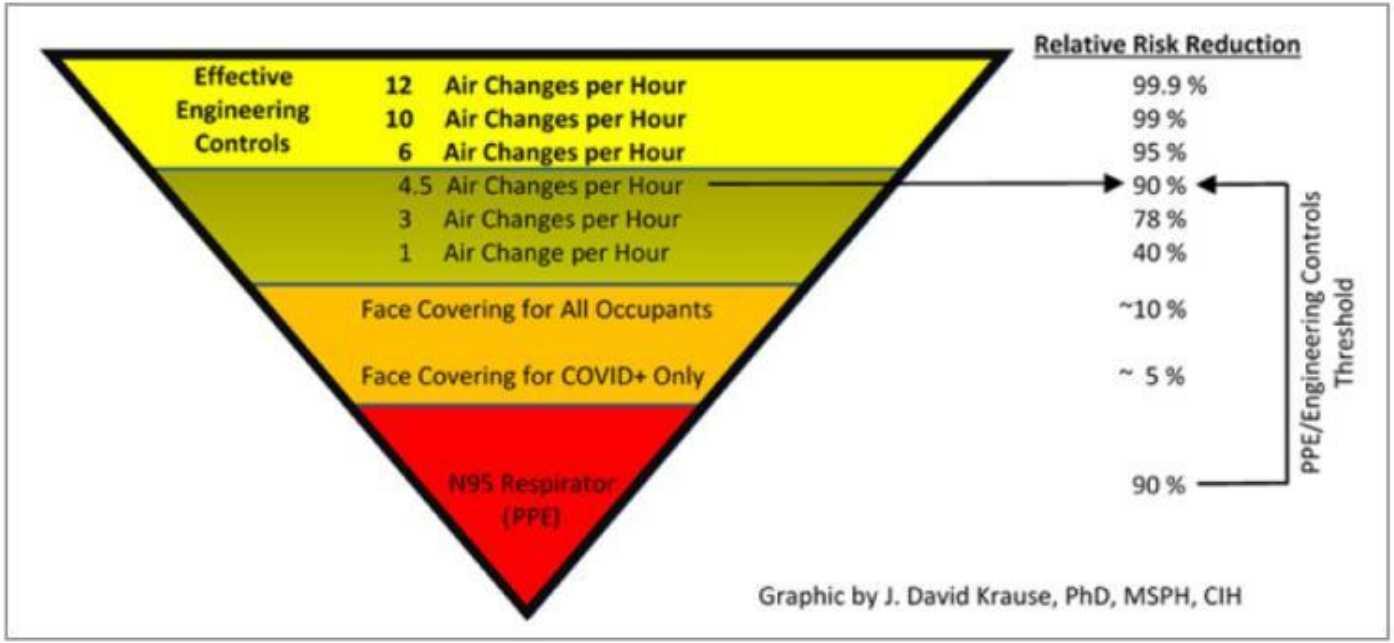
- Plasmacluster ions 1000-3000 ions/cm^3
- Fresh air change 2X/hr min by installing extraction fans at higher level
- Extra HEPA filters in smaller rooms

Why we need to improve Ventilation in Workplace

- Covid-19 is airborne virus
- Sufficient air change is very important
- To achieve a 90% risk reduction, you will require 4.5 times fresh air change per hour*
- To achieve a 99% risk reduction, you will require 10 times fresh air change per hour*
- Conventional centralized air-conditional design
  - fresh air change per hour between 1 – 3 times
  - fresh and recycle air change per hour between 8 – 12 times
- Split air con facilities are essentially 100% recycling so need to have fresh air change by extra ventilation fans

* Source: American Industrial Hygiene Association (AIHA) Guidance Document on Reducing the Risk of COVID-19 using Engineering Control, Version 4, 4 September, 2020.

Relative Risk Reduction for Different Air Change per Hour (ACH)



Source: American Industrial Hygiene Association (AIHA) Guidance Document on Reducing the Risk of COVID-19 using Engineering Control, Version 4, 4 September, 2020.

Example: Soon Soon Office AHU

Total air (fresh air + recycle air) flow rate, Q_1 = 10,000 ft ^{3}/min

Fresh air flow rate, Q_2 = 1,700 ft ^{3}/min

Fresh air percentage $= \frac{1{,}700}{10{,}000} \times 100 = 17\%$

Formula for air change per hour (ACH) $ACH = \frac{Q}{Vol} \times 60$

Therefore important to treat recycle air

Office Floor	Space Volume (Vol), ft^3	Fresh Air ACH	Total Air ACH
GF	41,671	17% X $\frac{10{,}000}{41{,}671}$ X 60 = 2.4	$\frac{10{,}000}{41{,}671}$ X 60 = 14.4
1F	50,605	17% X $\frac{10{,}000}{50{,}605}$ X 60 = 2.0	$\frac{10{,}000}{50{,}605}$ X 60 = 11.8
2F	48,487	17% X $\frac{10{,}000}{48{,}487}$ X 60 = 2.1	$\frac{10{,}000}{48{,}487}$ X 60 = 12.4

Air Change Calculator

Carbon Dioxide (CO_2) level as an indicator for IAQ

Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants. (US Environmental Protection Agency)

CO2 is one of the parameters of the IAQ.

Proper ventilation should keep carbon dioxide concentrations **below 1,000 ppm** and create indoor air quality conditions that are acceptable to most individuals.

In Soon Soon, we set the target to 800ppm max

Examples of CO_2 Levels in Soon Soon

Flourmill Office

Oilmills Control Room

SOF QC Lab

Training Centre

Level of CO_2 in Soon Soon HQ

Target: 800ppm max

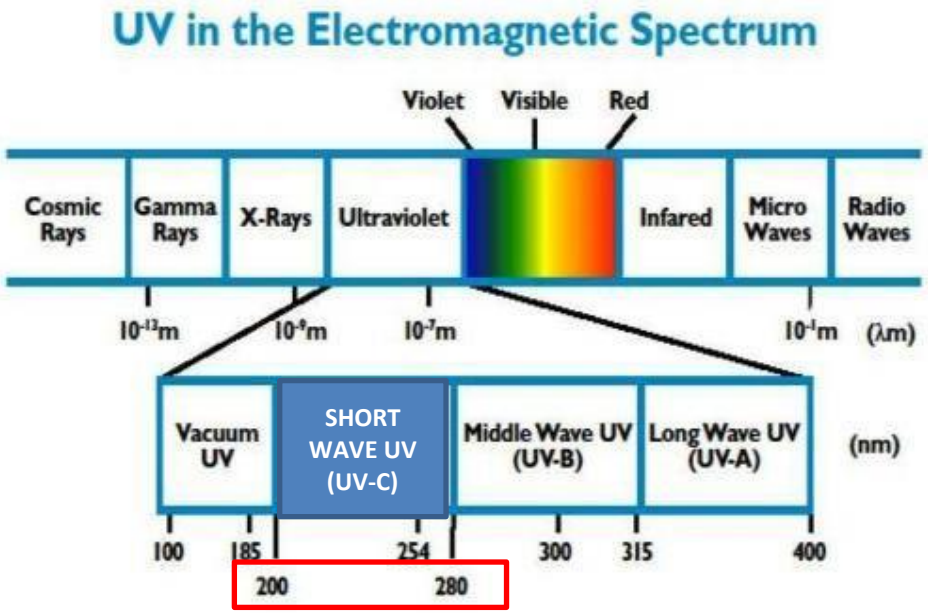
Location: Main Office, Level 2	CO_2 Reading , ppm
Flourmill Department	540
Flourmill Factory Manager Room	425
Flourmill Sales Manager Room	423
Trading Department	448
Oils and Fats Sales Manager Room	430
SOF & Purchasing Department	433
Group Supply Chain Manager Room	418
Logistic Department	435

Location (factory)	CO_2 Reading, ppm
Feedmills Control Room	465
Oilmills Control Room	459
Refinery Control Room	425
Flourmills Control Room	478
Flourmills QC Lab	457
Oilmills QC Lab	470
Food Research Centre	452

Location (other locations)	CO_2 Reading, ppm
Training Center (Finance)	484
Oilmills Department	442
SONA 1 and SONA 3 Factory Manager Room	440
QA Department	464
QA Manager Room	530
QA Meeting Room	440
Female Surau	429
Male Surau	525
Weighbridge 2 & Feedmill Department	446

Using UVC Light to Reduce Viral Load in AHU return air duct

Understanding UltraViolet C Light



UVC most effective to inactivate Covid-19

Q: Can UVB or UVA radiation inactivate the SARS-CoV-2 coronavirus?

A: UVB and UVA radiation is expected to be less effective than UVC radiation at inactivating the SARS-CoV-2 coronavirus.

- **UVB:** There is some evidence that UVB radiation is effective at inactivating other SARS viruses (not SARS-CoV-2). However, it is less effective than UVC at doing so and is more hazardous to humans than UVC radiation because UVB radiation can penetrate deeper into the skin and eye. UVB is known to cause DNA damage and is a risk factor in developing skin cancer and cataracts.
- **UVA:** UVA radiation is less hazardous than UVB radiation but is also significantly (approximately 1000 times) less effective than either UVB or UVC radiation at inactivating other SARS viruses. UVA is also implicated in skin aging and risk of skin cancer.

https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/uv-lights-and-lamps-ultraviolet-c-radiation-disinfection-and-coronavirus

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Brief Report

Susceptibility of SARS-CoV-2 to UV irradiation

Christiane Silke Heilingloh PhD [1], Ulrich Wilhelm Aufderhorst [1,2], Leonie Schipper BSc [1], Ulf Dittmer PhD [2,4], Oliver Witzke MD [1], Dongliang Yang [3,4], Xin Zheng [3,4], Kathrin Sutter [2,4], Mirko Trilling PhD [2,4], Mira Alt MSc [1], Eike Steinmann [5,#], Adalbert Krawczyk PhD [1,2,4,*,#]

[1] Department of Infectious Diseases, West German Centre of Infectious Diseases, Universitätsmedizin Essen, University Duisburg-Essen, Germany
[2] Institute for Virology, University Hospital Essen, University of Duisburg-Essen, Essen, Germany
[3] Hust Huazhong University of Science & Technology, Wuhan Union Hospital, Department of Infectious Diseases, Wuhan, China
[4] Wuhan-Essen Joint International Laboratory of Infection and Immunity, Essen, Germany
[5] Department of Molecular and Medical Virology, Faculty of Medicine, Ruhr University Bochum, Bochum, Germany

Key Words:
COVID-19
Ultraviolet light
Inactivation

A B S T R A C T

The coronavirus SARS-CoV-2 pandemic became a global health burden. We determined the susceptibility of SARS-CoV-2 to irradiation with ultraviolet light. The virus was highly susceptible to ultraviolet light. A viral stock with a high infectious titer of 5×10^6 $TCID_{50}$/mL was completely inactivated by UVC irradiation after nine minutes of exposure. The UVC dose required for complete inactivation was 1,048 mJ/cm². UVA exposure demonstrated only a weak effect on virus inactivation over 15 minutes. Hence, inactivation of SARS-CoV-2 by UVC irradiation constitutes a reliable method for disinfection purposes in health care facilities and for preparing SARS-CoV-2 material for research purpose.

What's known about UVC light and the new coronavirus?

UVC light can be used to kill the new coronavirus, SARS-CoV-2. Let's look at what the research has discovered about UVC light and this coronavirus so far.

UVC light for disinfecting liquids

A recent study in the American Journal of Infection Control (AJIC) investigated using UVC light to kill large amounts of the new coronavirus in liquid cultures.

The study found that UVC light exposure completely inactivated the virus in 9 minutes.

UVC light for disinfecting surfaces

Another study, also published in the AJIC, looked at using a specific type of UVC light to kill SARS-CoV-2 on laboratory surfaces. The study found that the UVC light reduced the live coronavirus by 99.7 percent in 30 seconds.

The type of UVC light used in this study is called far-UVC light, which is UVC light between the wavelengths of 207 and 222 nanometers.

Far-UVC light is still damaging to germs but is less of a hazard to your skin and eyes than other types of UVC light.

UVC light for disinfecting air

One study, published in the journal Scientific Reports, explored using far-UVC light to kill two types of human coronaviruses in the air. These two coronaviruses, 229E and OC43, can cause the common cold in humans.

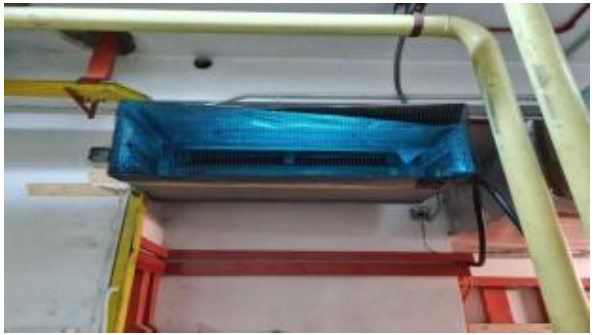
Based off their results with these viruses, researchers estimated that, when applied to current regulatory standards, far-UVC light could kill 99.9 percent of airborne coronaviruses in about 25 minutes. They believe that these findings would extend to SARS-CoV-2 as well.

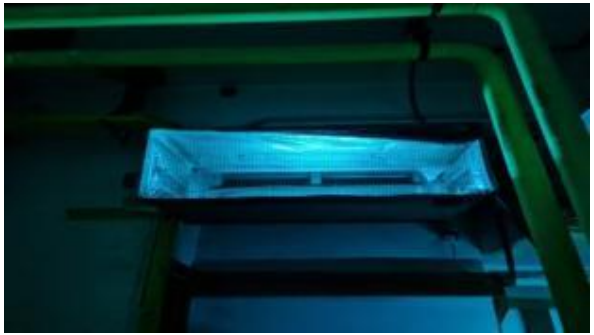
Using UVC Light to reduce viral load

https://www.healthline.com/health-news/how-the-coronavirus-spreads-indoors-and-what-can-be-done-about-it/

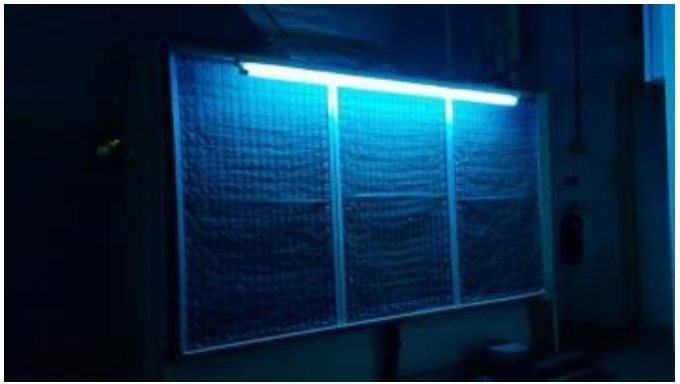
Example UVC Light at Soon Soon

Warning light outside room indicating UVC Light is ON inside AHU Room





UVC at Return Air Duct



UVC at AHU Inlet

HEPA Filter in Reducing Viral Load

HEPA Filter Working Principle

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People™

5. What is a HEPA filter and why use a portable HEPA air cleaner?

Research shows that the particle size of SARS-CoV-2 is around 0.1 micrometer (µm). However, the virus generally does not travel through the air by itself. These viral particles are human-generated, so the virus is trapped in respiratory droplets and droplet nuclei (dried respiratory droplets) that are larger. Most of the respiratory droplets and particles exhaled during talking, singing, breathing, and coughing are less than 5 µm in size. By definition, a High Efficiency Particulate Air (HEPA) filter is at least 99.97% efficient at capturing particles 0.3 µm in size. This 0.3 µm particle approximates the most penetrating particle size (MPPS) through the filter. HEPA filters are even more efficient at capturing particles larger **and** smaller than the MPPS. Thus, HEPA filters are no less than 99.97% efficient at capturing human-generated viral particles associated with SARS-CoV-2.

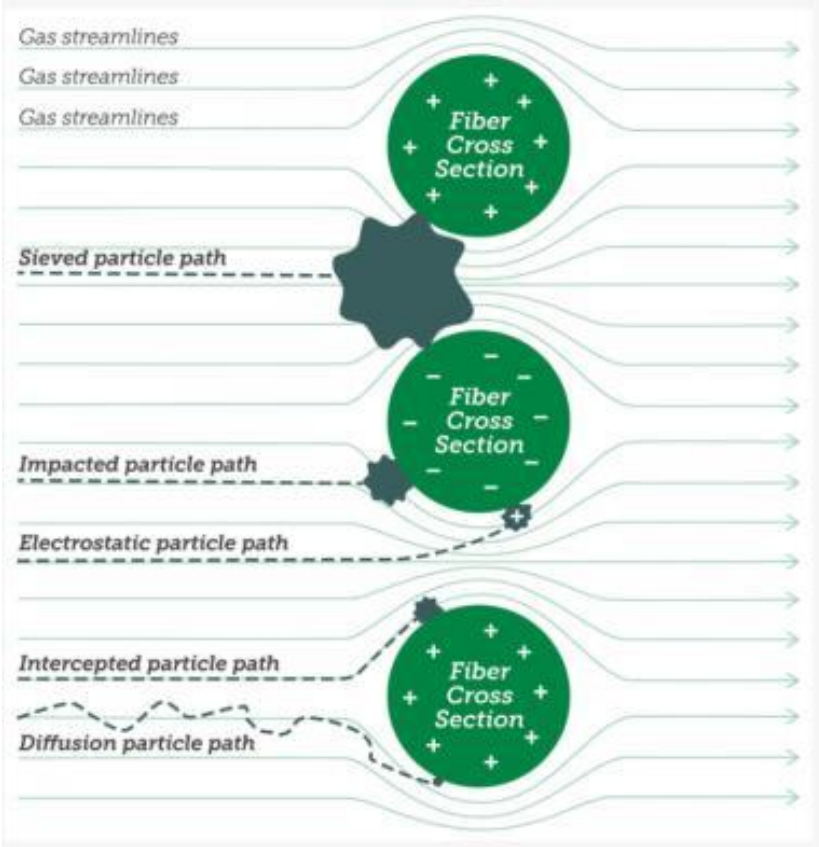
Portable HEPA filtration units that combine a HEPA filter with a powered fan system are a preferred option for auxiliary air cleaning, especially in higher risk settings such as health clinics, vaccination and medical testing

- Research shows COVID-19 virus particle size is around 0.1µm
- The virus does not travel through air by itself
- They are human generated i.e. they are formed when virus get trapped in our respiratory droplets
- These respiratory droplets of about 5µm will be exhaled/ blown out from the body during talking, breathing, coughing etc
- HEPA filteris **at least 99.97% efficient** at capturing particles of 0.3µm in size

HEPA Working Principle

HEPA filter trapped particles using 5 mechanisms

1. Sieve (particle size more than 0.3µm)
2. Impaction (particle size around 0.1µm)
3. Electrostatic attraction (small charged particle)
4. Interception (particle size 0.05 to 0.1µm)
5. Diffusion (particle size less than 0.05µm)



Where and why UVC and HEPA filter may not be effective

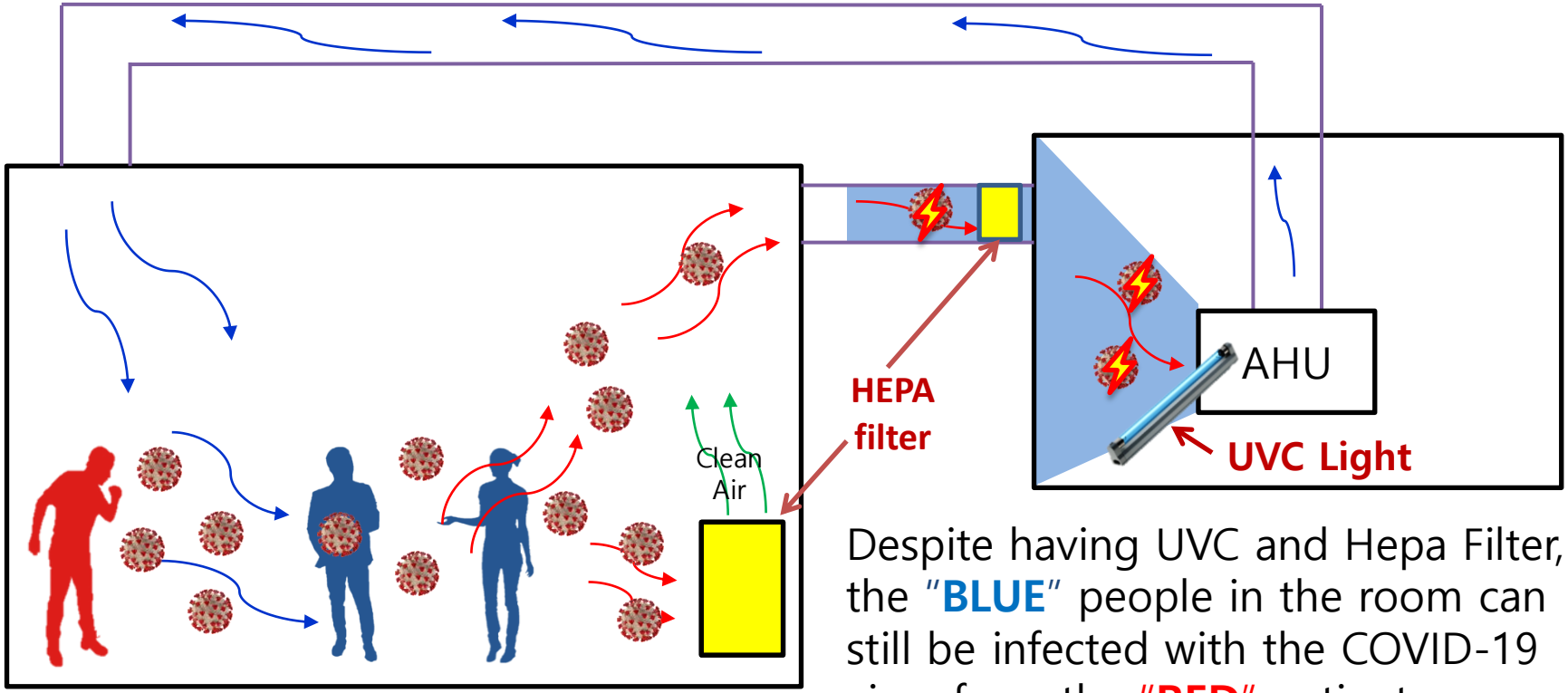
- UVC light treats air in the returned air duct therefore can prevent spread of virus to other rooms.

- HEPA Filter filters the air in the air duct or as a stand alone unit, therefore can prevent the spread to other rooms and as a stand alone in a room it can provide limited protection.

- However if somebody is COVID-19 positive in a room, the virus will migrate towards the returned air duct or stand alone HEPA filter potentially affecting all the people down wind.

- Therefore with the current very infectious Delta variant, we need to deactivate the virus in-situ to prevent spread within the room.

Potential of viral spread in rooms protected with UVC Light and HEPA filter



Despite having UVC and Hepa Filter, the "**BLUE**" people in the room can still be infected with the COVID-19 virus from the "**RED**" patient

Plasmacluster Ionizer

Sharp Plasmacluster Ionizer Report

SHARP NEWS
http://www.sharp.co.jp/

SHARP CORPORATION
HEAD OFFICE 22-22 Nagaike-cho, Abeno-ku, Osaka 545-8522 JAPAN
Tel 06.6621.1272 Fax 06.6628.1667
TOKYO OFFICE 8-banchi, Ichigaya-Hachiman-cho, Shinjuku-ku, Tokyo 162-8408 JAPAN
Tel 03.3260.1870 Fax 03.3260.1822

FOR IMMEDIATE RELEASE
Press Release No. 04-026
Date: July 27, 2004

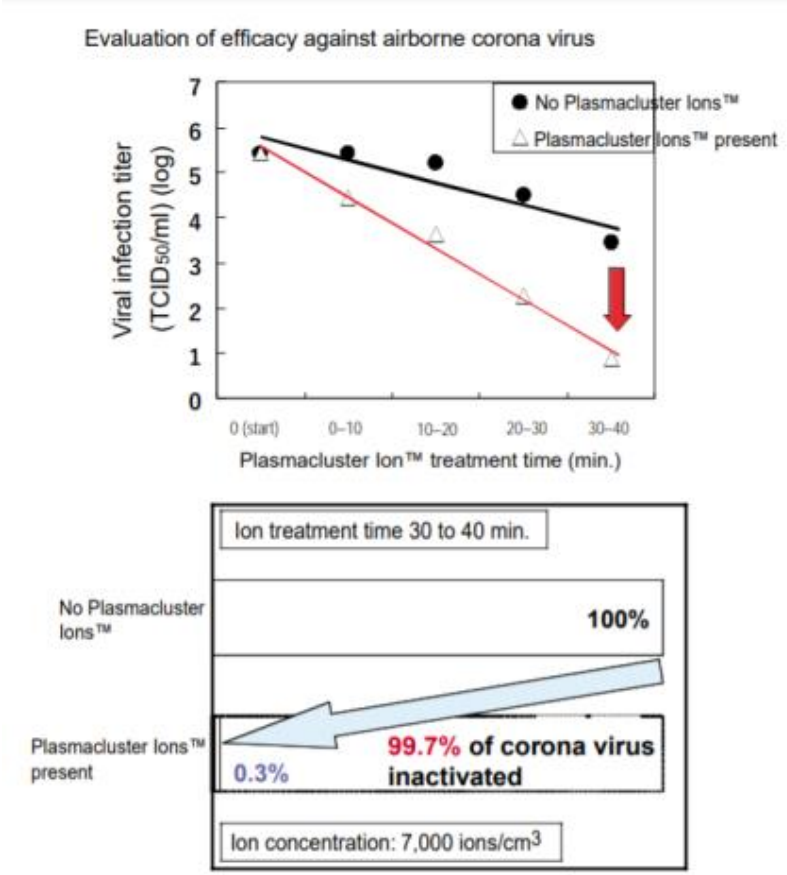
Plasmacluster Ions™*1 Inactivate an Airborne Corona Virus—A World First*2

Verification Research Conducted Jointly with the Kitasato Institute

Recently, new viral-based infectious diseases such as SARS (corona viruses) and avian influenza (orthomyxoviruses) have made their appearance, and cases that threaten human health are on the increase. In seeking new technologies for purifying the air, Sharp has systematically verified the efficacy of Plasmacluster Ions™ in deactivating harmful substances that are the cause of illnesses spread through the medium of the air.

Now, in collaboration with Director & Visiting Professor Tatsuo Suzuki PhD and Assistant Director Noritada Kobayashi PhD of the Kitasato Institute Medical Center Hospital, one of the world's most prestigious viral research organizations, we have verified that Plasmacluster Ions™ inactivate the feline corona virus (FCoV), a member of the Coronaviridae (corona virus) family. The results demonstrated that 99.7% of the virus is rendered inactive within 40 minutes. In other words, we proved that Plasmacluster Ions™ work to destroy the virus and control its capacity to infect.

https://global.sharp/pci/en/certified/pdf/viruses_01.pdf



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the japan times
THE INDEPENDENT VOICE IN ASIA

BUSINESS / TECH

Sharp says air purification technology can reduce airborne coronavirus

Jiro Yasuda, a professor at Nagasaki University, conducts an experiment to examine the effectiveness of Sharp's Plasmacluster air purifying technology against novel coronavirus particles in air. | COURTESY OF SHARP

BY KAZUAKI NAGATA
STAFF WRITER

SHARE Sep 8, 2020

Sharp Corp. said Monday that research by the firm shows its air purifying technology is able to reduce airborne novel coronavirus particles, claiming it as a world first.

The Osaka-based electronics maker said its Plasmacluster technology, which emits positive hydrogen ions and negative oxygen ions through plasma discharge, cut concentrations of novel coronavirus particles by about 90 percent in an experiment jointly conducted with Nagasaki University and Shimane University.

Since the research was conducted on a small scale and in a controlled environment, it remains unclear how effective the technology would be in a real-life setting.

While Sharp said its test was the world's first to demonstrate an inhibitory effect on the airborne virus through an air purification technology, a few other Japanese makers have conducted similar experiments.

In July, Panasonic Corp. and Daikin Industries Ltd. said their air purification technologies could inhibit the virus when attached to a surface (as opposed to Sharp's airborne particles). But since their experiments were also conducted in small-scale controlled environment, how effective the equipment can be under everyday conditions is unclear.

Still, the makers have seen rising demand for air purifiers in the past several months. According to the Japan Electrical Manufacturers' Association, the shipment value of such products between April to July jumped about 71 percent, to ¥14.9 billion, compared to the same period in the previous year.

Researchers for Sharp's experiment sprayed a solution containing the novel coronavirus into a three-liter apparatus equipped with a Plasmacluster device. The aerosolized solution was then retrieved after being exposed to ions for 30 seconds to check for an inhibitory effect.

The infectious titer in the retrieved solution was reduced by 91.3 percent compared with one that was not exposed to the ions, Sharp said.

"Based on the result of this experiment, we will consider and provide effective uses of the Plasmacluster technology to mitigate the risk of coronavirus infection," said Masahiro Okitsu, who heads the smart appliances and solutions division at Sharp.

He said the next step was to conduct a test that more closely simulates a real life environment.

Plasma Air Ionization Proven to Reduce Coronavirus Surrogate MS2 Bacteriophage by 99% in Independent Spanish Testing

USA - English

Successful certified testing conducted in a building facility proves virus destroying power

NEWS PROVIDED BY
Plasma Air
Jun 16, 2020, 06:00 ET

STAMFORD, Connecticut, June 16, 2020 /PRNewswire/ -- Testing carried out by Tayra and backed by the Spanish Ministry of Defense Biological Laboratory in Spain has proven the effectiveness of Plasma Air Ionization technology in the reduction of MS2 Bacteriophage, a surrogate for SARS-CoV-2 (COVID-19), in indoor environments.

There is mounting research to suggest that clean, disinfected air plays a vital role in preventing the spread of SARS-CoV-2, the virus causing COVID-19. While respiratory droplets are considered the primary transmission route, aerosols are being considered by many health authorities as a possible mode of infection transmission along with surface contact. This suggests that viral particles can remain suspended in the air for long periods and can be inhaled.

The research tests were conducted in a Madrid hotel converted into a residence and confinement center for medical staff during the pandemic. The experiments took place in simulated ICU hospital rooms within the hotel. This environment was explicitly designed to test air ionization on small aerosolized viral particles. The laboratory analysis was carried out at a nearby operations center of the Spanish Ministry of Defense from May 4th to May 14th.

https://www.prnewswire.com/news-releases/plasma-air-ionization-proven-to-reduce-coronavirus-surrogate-ms2-bacteriophage-by-99-in-independent-spanish-testing-301076955.html

EddaAir (China) Plasmacluster Ionizer Report

Test Report

Report No : WP-21019007-JC-01En Page : 3 / 4

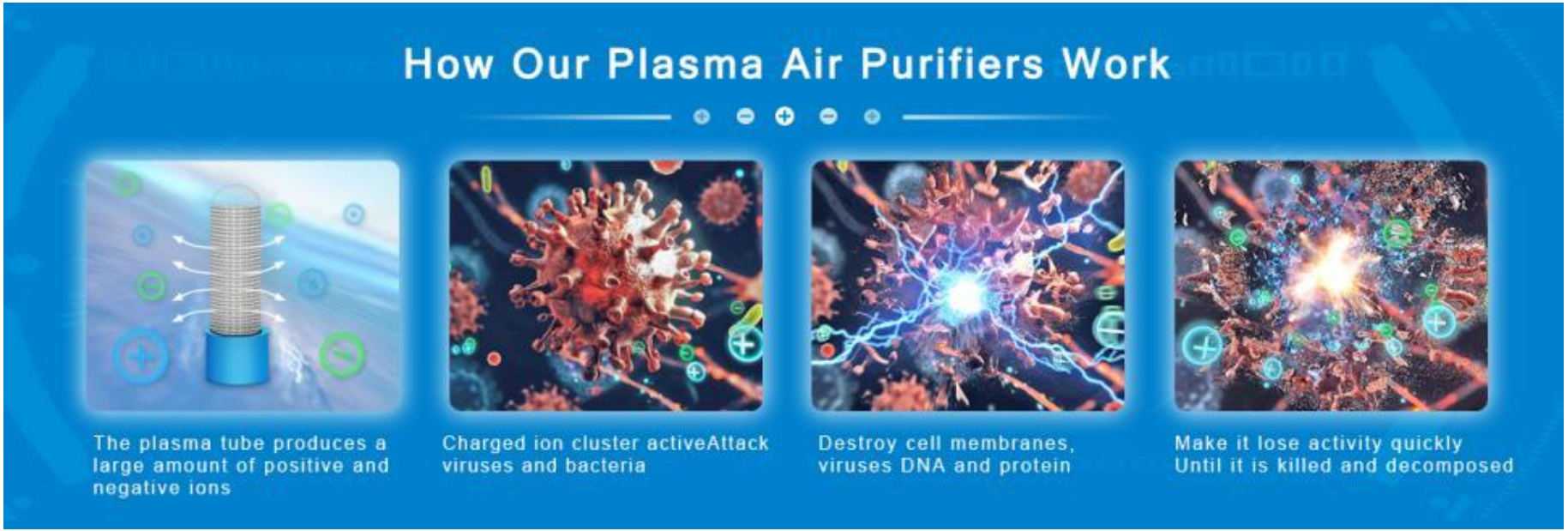
Sample Name	EddaAir Plasma Ions Air Sterilizer	Sample Received Date	2021.01.06
Test Item	Virus Inactivation Test: HCoV-229E	Test Period	2021.01.06 – 2021.02.01

1. Test Result

Virus and host cell	Action Time	Group	Logarithm of infectivity titre of virus $lgTCID_{50}/ml$	Average titre infectivity of virus $lgTCID_{50}/ml$	Average infectivity titre of virus $TCID_{50}/ml$	Average logarithm reduction value	Virus inactivation ratio%
HCoV-229E Vero-E6	10min	Control Group 1	5.53	5.52	3.31×10^5	>4.02	>99.99
		Control Group 2	5.54				
		Control Group 3	5.50				
		Test Group 1	<1.50	<1.50	<31.6		
		Test Group 2	<1.50				
		Test Group 3	<1.50				
HCoV-229E Vero-E6	30min	Control Group 1	5.53	5.52	3.31×10^5	>4.02	>99.99
		Control Group 2	5.54				
		Control Group 3	5.50				
		Test Group 1	<1.50	<1.50	<31.6		
		Test Group 2	<1.50				
		Test Group 3	<1.50				
HCoV-229E Vero-E6	60min	Control Group 1	5.53	5.52	3.31×10^5	>4.02	>99.99
		Control Group 2	5.54				
		Control Group 3	5.50				
		Test Group 1	<1.50	<1.50	<31.6		
		Test Group 2	<1.50				
		Test Group 3	<1.50				

[Coronavirus test report]

Plasmacluster Ionizer Working Principle



https://eddaair.en.alibaba.com/

Suggested Plasmacluster Ionizer for Central Air Conditioner

EddaAir® Plasma ions

PS-502T

- Air volume:5000 CFM
- Voltage:AC 120V/230V
- Power consumption:20W
- Application area:200㎡
- Size:192*192*430mm

PS-504T

- Air volume:6500CFM
- Voltage:AC 120V/230V
- Power consumption:25W
- Application area:400–600㎡
- Size:280*280*460mm

PS-509TT

- Air volume:17000 CFM
- Voltage:AC 120V/230V
- Power consumption:60W
- Application area:1800㎡
- Size:710*280*320mm

https://eddaair.en.alibaba.com

Suggested Plasmacluster Ionizer for Split Unit Air Conditioner

PS-300

- Air volume:300 CFM
- Voltage:DC 12V
- Power consumption:5W
- Application area:20㎡
- Size:120*50*30mm

PS-400

- Air volume:400 CFM
- Voltage:DC 12V
- Power consumption:6W
- Application area:30㎡
- Size:160*50*30mm

EddaAir® Plasma ions

PS-500

- Air volume:580 CFM
- AC120V/AC230V/DC 12V
- Power consumption:7W
- Application area:30–50㎡
- Size:200*70*50mm

https://eddaair.en.alibaba.com/

Air Oasis (USA) Plasmacluster Ionizer

Air Oasis Nano Induct

Case Study utilizing the nano induct

Multi-Containment Indoor Air Quality (IAQ) Report: In only 3 hours, Air Oasis significantly reduced all containments in a 2,000 sq. ft. warehouse.

	Removal Rate
Total Volatile Organic Compounds	99.0%
Formaldehyde	98.5%
Hydrogen Sulfide	97.0%
Total Bacteria Count	82.7%
Ammonia	73.3%

Air Oasis (USA) Plasmacluster Ionizer

Air Oasis Bi-Polar® 2400 BMS

Contaminant Removal Rate Results

	Removal Rate
E. Coli	Up to 99.68%
VRE	Up to 99.00%
Air borne mold reduction	Up to 99.00%
E. faecium reduction	Up to 99.00%
Formaldehyde reduction	Up to 99.00%
TVOC reduction	Up to 99.00%
H5N1 & H1N1 reduction	Up to 99.00%
Feline Coronavirus reduction	Up to 99.00%
Coxsackie Virus reduction	Up to 99.00%
MRSA (STAPH)	Up to 96.24%
Air borne particulate & allergen reduction	Up to 90.00%
C. Diff	Up to 86.87%
(CDIFF) reduction	Up to 86.00%
M. terrae (TB surrogate)	Up to 69.09%

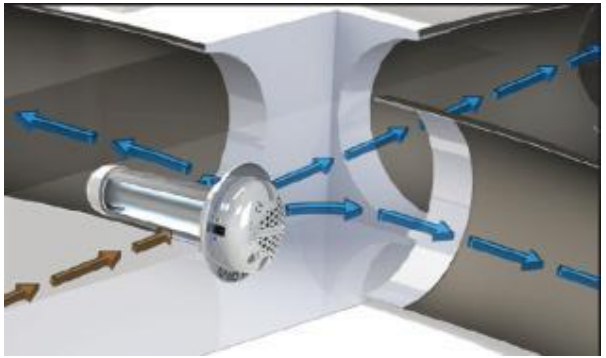
https://www.airoasis.com/

Air Oasis Plasmacluster Ionizer Installation Method

Split unit air conditioner

Ceiling mount air conditioner

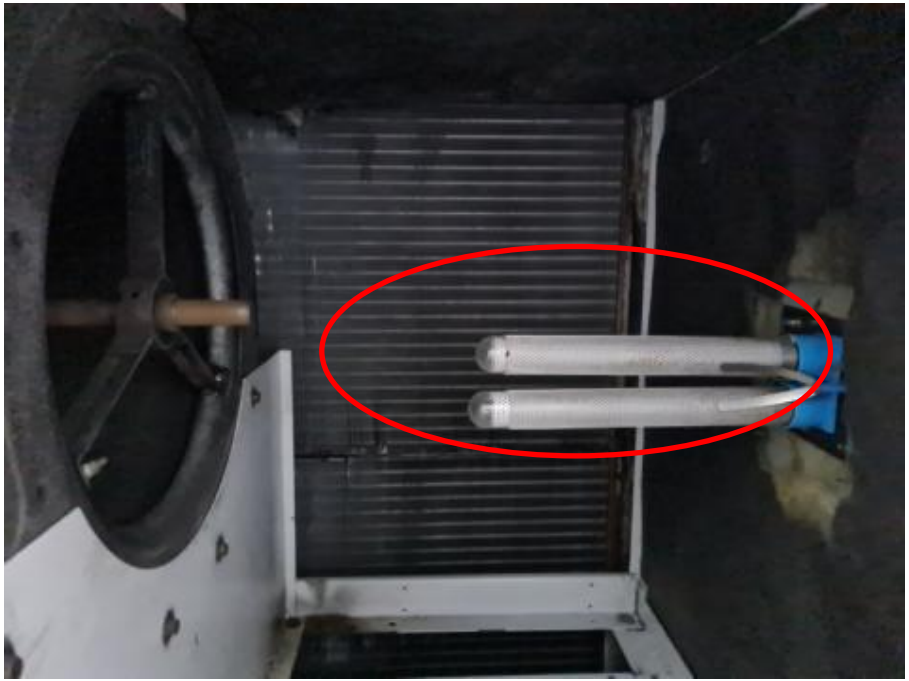
Blow fan



In the air duct

https://www.airoasis.com/

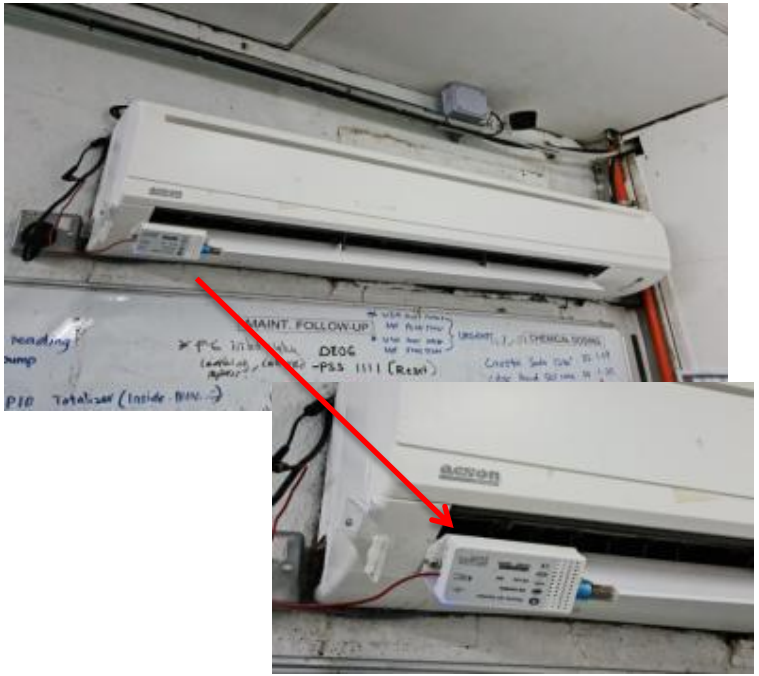
Example Plasmacluster Ionizer Installation at Soon Soon



Centralized air condition
plasmacluster ionizer installed location

Portable plasmacluster ionizer/
HEPA filter for small office room

Plasmacluster Ionizer for Split Type Air Conditioner at Soon Soon



Ion Readings at Soon Soon

2183 ions/ cm^3

2337 ions/ cm^3

Typical Ion Readings at various locations

Location	Positive Air Ion	Negative Air Ion
Indoor	25	25
City Outdoor	500	300
Park	700	3,500
Rural	1200	1,000
Mountainous Seaside	13,800	1,200
Waterfall	1,600	32,000

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6213340/
https://acp.copernicus.org/articles/12/3687/2012/acp-12-3687-2012.pdf
https://aaqr.org/articles/aaqr-14-06-oa-0123.pdf

Ozone Safe Level

The **Food and Drug Administration** (FDA) requires ozone output of indoor medical devices to be no more than 0.05 ppm.

The **Occupational Safety and Health Administration** (OSHA) requires that workers not be exposed to an average concentration of more than 0.10 ppm for 8 hours.

The **National Institute of Occupational Safety and Health** (NIOSH) recommends an upper limit of 0.10 ppm, not to be exceeded at any time.

EPA's National Ambient Air Quality Standard for ozone is a maximum 8 hrs average outdoor concentration of 0.08ppm

Ozone Level at Soon Soon

0.000 ppm

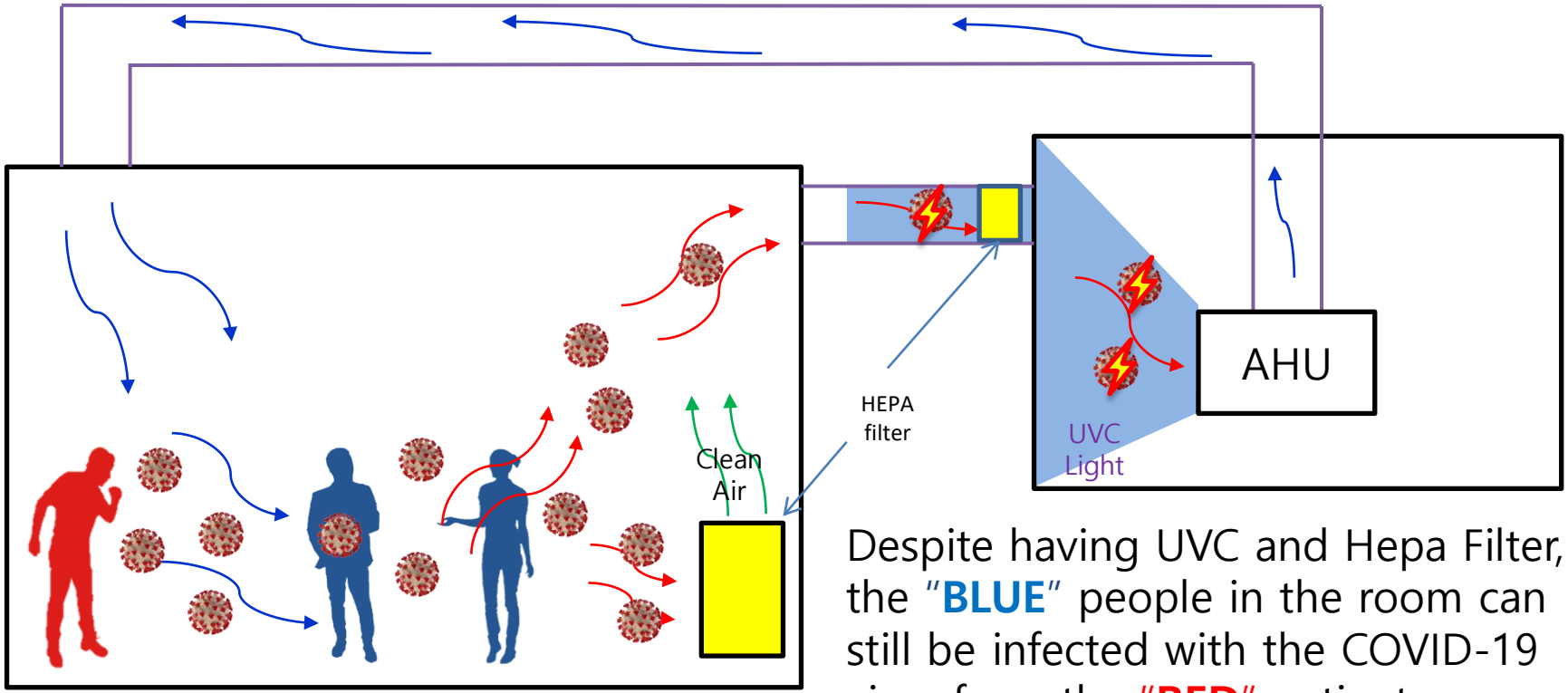
0.000 ppm

0.000 ppm

Where plasmacluster Ionizer is more effective?

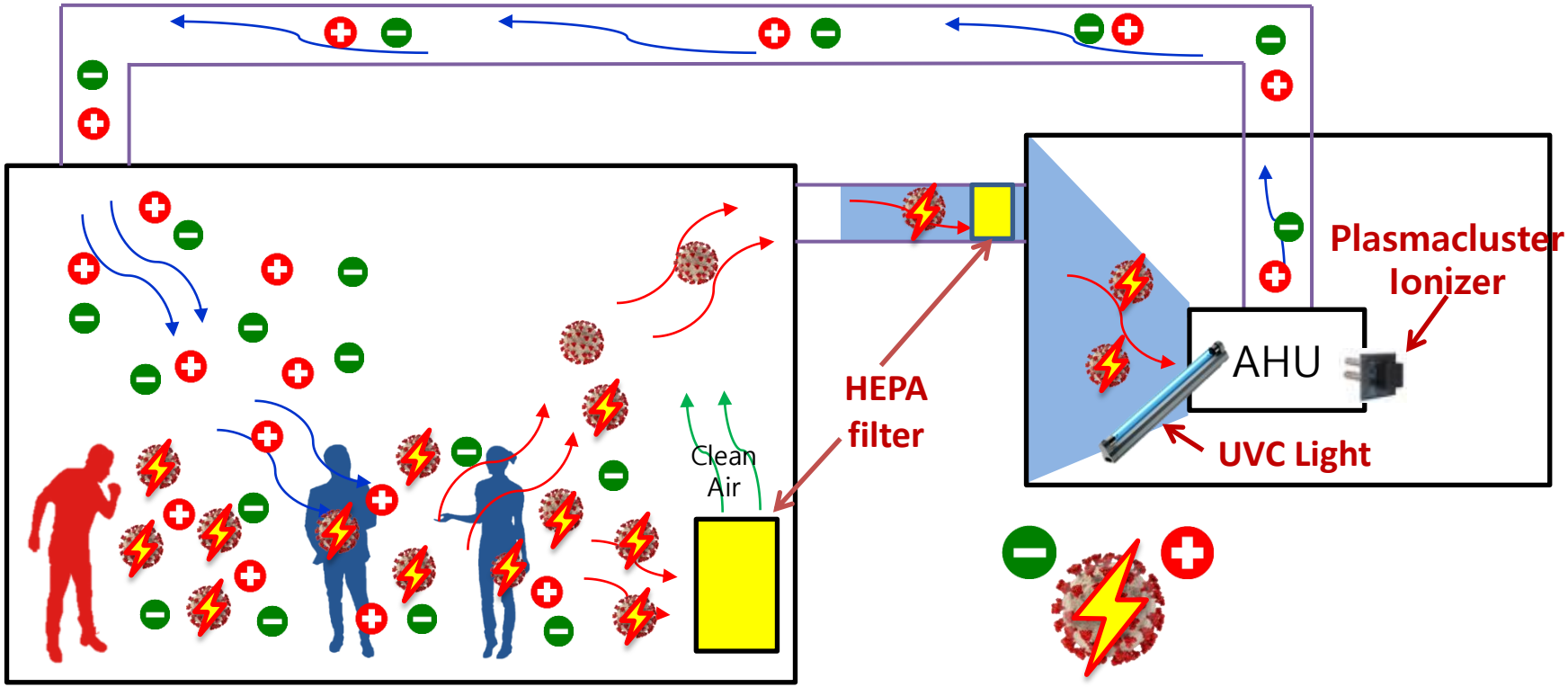
- Because plasmacluster ionizers can deactivate the virus in-situ in the room.
- Any virus emitting from the COVID patient will be killed immediately
- By having plasma ions in the cold air blowing into a room, ensures a constant stream of plasma ions providing a protective environment against COVID-19 virus.

Office/ workplace environment if installed with UVC and HEPA Filter



Despite having UVC and Hepa Filter, the "**BLUE**" people in the room can still be infected with the COVID-19 virus from the "**RED**" patient

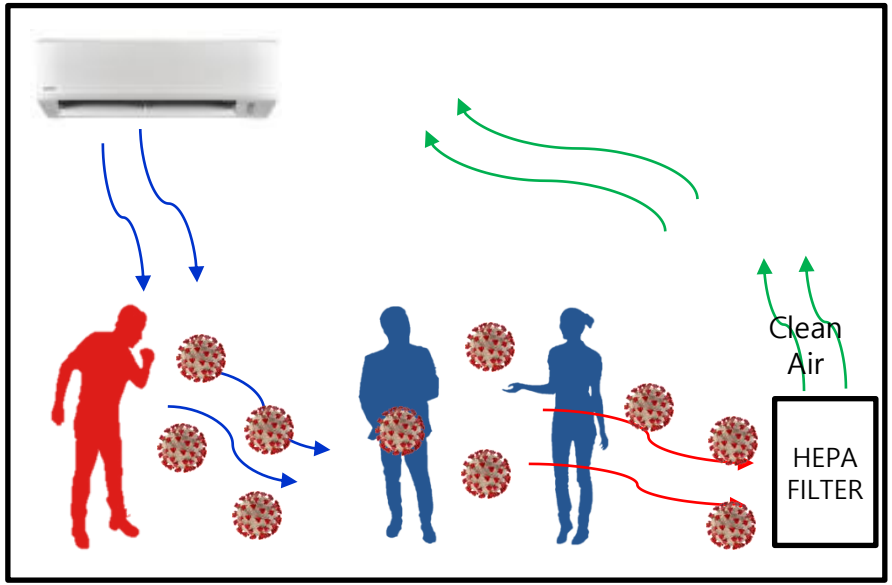
Safer in-room environment with UVC, HEPA Filter & **Plasmacluster Ionizer**



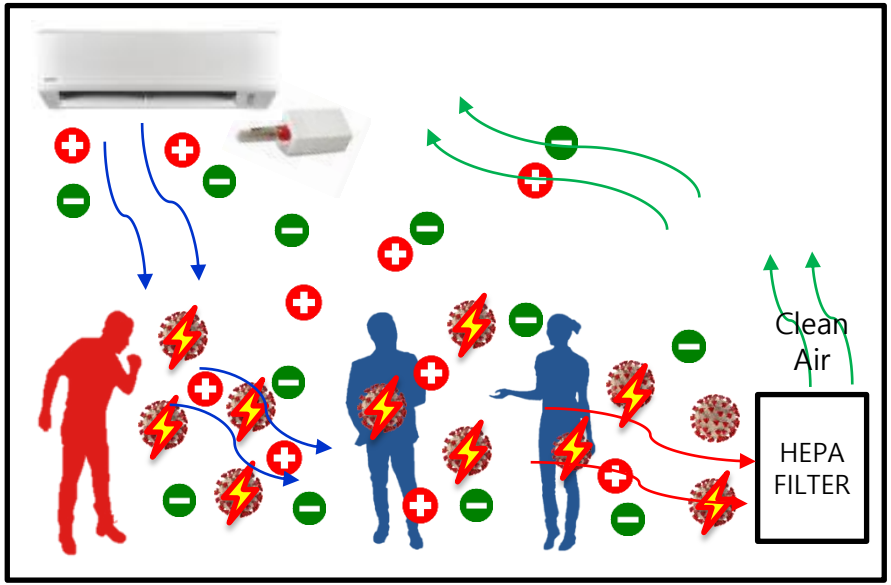
Plasmacluster Ions can deactivate >99% virus

When PAI & NAI contact virus, it will inactivated it

Where HEPA filter alone are not effective compared with Plasmacluster Ionizers in Rooms Using Split-Con?



Room with HEPA filter



Room with HEPA filter with cold air treated with Plasmacluster Ionizers

Comparison of UVC Light, HEPA Filter & Plasmacluster Ionizer

	UVC LIGHT	HEPA FILTER	PLASMACLUSTER IONIZER
Used Condition	Cannot be used with human presence	Can use at any locations	Can use at any locations
Methodology and usage	Inactivate the virus through direct exposure Usually used in returned air duct of central air-con	Virus trapped while passing through filter Can be used as a stand alone or in the return air duct of centralize air-con	Inactivate the virus directly with negative and positive ions Can be used in outlet of the cold air outlet of centralize air-con/split con
Effectiveness	Proven can inactivate virus up to 99.7%	Proven can trap virus 99.9%	Proven can kill virus 99.0%
Usage concern	Virus cannot be inactivated in the room; only in returned air-duct	Virus is only inactivated when sucked through the filter at certain locations or in the air duct	Effective to inactivate the virus in-situ maintaining a protective coverage
Installation	Easy to install	Difficult to install at current AHU	Easy to install
Cost	Minor cost	High cost	Moderate cost

Conclusion on air treatment in workplace

1. In order to have the maximum protection of your staff using centralized air-con in office and workplace, you need to have plasmaclusters ionizers in your cold air stream and UVC and/or HEPA Filters in the return air duct.

2. In the case you are using split air-con you must put plasmacluster ionizers in your cold air stream and use the ventilation fans to increase the fresh air change in the workplace and possibly use stand alone HEPA filters.

3. You can also use in small rooms, portable HEPA Filters with plasmacluster ionizers but you must take care of its location i.e must be at table top level and not drawing potential streams of virus across the other occupants

Take Home Messages

Take Home Messages

1. Malaysian government is still imposing guidelines like quarantine of COVID-19 patients and their close contacts. So if you don't control well, your factory/ office will shut down and you may have insufficient workers.

2. Therefore with the Delta variants and the imminent implementation of the endemic phase liberalisation, your SOP and mitigation programs have to be even better to ensure your operations can continue smoothly without disruptions from COVID-19 clusters forming from your workplace.

3. Minimizing the number of close contact is very important. In the event, there are any positive cases, the number of people required to be quarantined cases can be minimized.

Take Home Messages

4. Self-test antigen kits are very useful as
   - it allows early detection of symptomatic cases in the workplace
   - it helps to limit the spread of COVID-19 by identifying positive symptomatic cases and taking appropriate measures.

5. Ventilation is very important to improve indoor air quality. However, in situations that do not permit high ventilation rates, engineering and administrative controls can be used.

6. The level of Carbon Dioxide can be used as a control for the Indoor Air Quality. Generally a level below 1000ppm is considered good.

Take Home Messages

7. COVID-19 is an airborne disease. To achieve a 90% risk reduction, you will require 4.5 times fresh air change per hour (ACH). Realistically, this is difficult to be achieved. Therefore, we need to use air treatment to achieve our goals of minimizing risk of COVID-19 spreading in our workplace.

8. Understand the principles of air treatment is very important so that correct decisions and measures can be used to ensure the air system in the workplace is safe from COVID-19 spread. High fresh air-exchange coupled with plasmacluster ionizer, HEPA filter and UVC Light can be deployed to minimise the risks of COVID-19 spreading through the air.

Latest Government Policy Changes

1. The government has announced that at the end of October this year, Malaysia will transition from pandemic to endemic phase. The government will liberalise the movement of people and will allow many social activities such as sports, dining in, living in hotels, opening of cinemas etc.

2. Since 70% or more population will be vaccinated by then, serious illness and death rates may fall significantly, however there will still be significant numbers of people catching COVID-19 as vaccination only offers limited protection.

3. Therefore, with increasing number of asymptomatic COVID-19 positive staff in your workplace, it is likely many clusters may develop undetected. Unfortunately it is likely MOH will still require you to quarantine COVID-19 positive staff and their close contacts for 10 days. This may cause serious disruptions in your work place or even close it down completely.

Latest Government Policy Changes

4. We are now developing the new protocols necessary to prevent COVID-19 from spreading in our workplace during the endemic phase which will also include a new testing protocol based on the number of close contacts our staff have in their normal working and home life. This will be translated into a testing protocol which will test more often people with higher number of close contact in their daily life.

5. We will be able to share with you our new protocols at the next FMM webinar. So Stay Tune!

THANK YOU

http://www.soonsoongroup.com/index.php/our-response-to-covid-19
Email: covid19taskforce@soonsoongroup.com