

DYNAIR *Products*

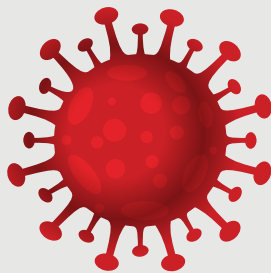
For COVID-19 Isolation Rooms

High Fidelity ventilation and filtration systems



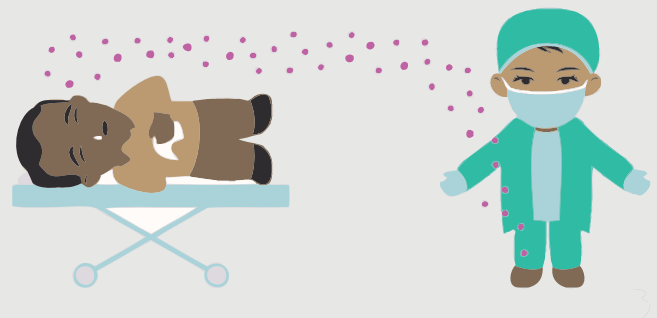
COVID-19 Scenario & DYNAIR Solutions:

In light of current situation caused by COVID-19, a novel coronavirus of SARS family had resulted in on-going 2019-2020 pandemic, known to cause acute respiratory illness to humans and is claimed by numerous health authorities to be highly contagious. Globally the governments are working round the clock to setup guidelines to curtail the spread, isolate and treat the infected. Numerous field and makeshift hospitals are being established for having maximum possible isolation among patients getting treated.



CORONAVIRUS
0.06- 0.14 MICRONS
(SARS.COVID 2)

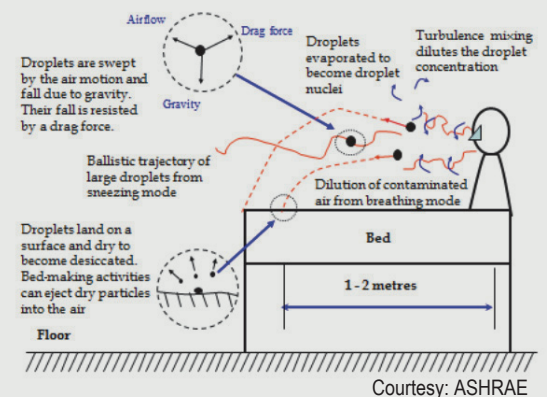
Putting in perspective to human eye, the size of COVID-19 is roughly 10,000 times smaller to be visualized. This fine size puts ample challenges to efficiently filtrate the COVID-19 particles which the scientific communities have found to be potent for 3-7 days long enough to infect another healthy human.



In these challenging times of increasing infected cases with governmental organizations setting up portable isolation wards that are fully concealed with negative pressure cabins inline with ASHRAE 170, indoor air before being exhausted outside.

DYNAIR products- DEV / DAH are specifically designed for filtration and ventilation of isolation wards and suitable for cabins sized as per-ASHRAE Journal Feb.2019

Maico Gulf has dedicated R&D and application support team in RAK facility specializing in product customization and able to cater current ventilation product needs for field hospitals.



DYNAIR products are manufactured in accordance to varying global standards such as”

- AMCA - 210/300 (Air Movement & Control Association)
- UL (Underwriter's Laboratory)
- ETL Listing in accordance with UL 710
- EN (European standards) 12101-3, F400
- ISO (International Standards Organization) & OHSAS (Occupational Health & Safety Assessment Series)

Given the relatively lesser time for sourcing critical products such as Ventilation/Filtration units for hospitals, Maico Group factories had stocked essential components and shall be able to cater to tight timeline demands of customer.

The factory is operating in accordance to governmental guidelines and the products are manufactured, packaged in sterile environment and disinfected thoroughly before dispatched.

Dynair Ventilation Product For Exhaust & Supply In Isolation Rooms

(DEV)- Dynair product for airborne infectious isolation room

Dynair ETL listed DEV Units are tested as per standard UL 710, it can be assured that the DEV units will withstand harsh operating conditions and will remove all the exhaust containments in efficient manner without compromising the comfort level of the occupants.

Certification

ETL Listed as per Std. UL710

ETL CLASSIFIED

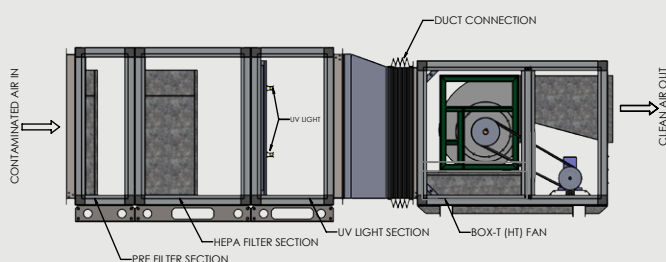


CONFORMS TO
UL STD 710

Intertek

DEV With BOX-THT

STAGES



HEPA filter with filter class as H14 (EN1822) with efficiency of 99.999%

Fan section with motor outside the airflow path for easy maintenance.

01

Pre filter with MERV rating of 5 to 6.

02

03

UV-C is most effective at sterilizing when in "C" band range of 200-280nm. UV light then breaks apart the molecular bonds of the DNA of the microorganism killing the microbe or inhibiting its ability to reproduce. (Upon request)

04

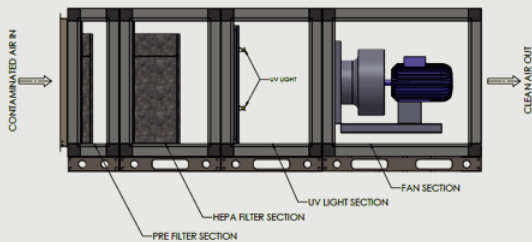
05

Heating element - Coronavirus gets deactivated due to melting of the outer protein shell at high temperature (56 °C for 15 min) (referred from multiple scientific publications) (Upon request)

Cabinet construction

Pentapost design for high strength, PPGL sheet with 55% aluminium & 45% zinc for double protection, OR PPGL sheet, OR GI Sheet.

DEV With Plenum Fan



STAGES

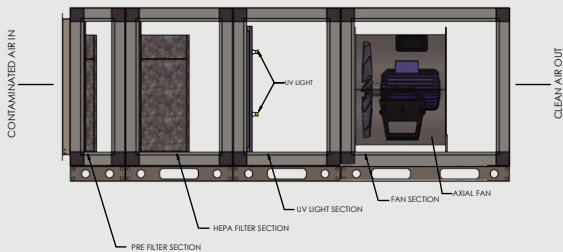
HEPA filter with filter class as H14 (EN1822) with efficiency of 99.999%

Direct driven plenum fan with VFD for varying ventilation needs (AC-EC Option for fan)

- 01 Pre filter with MERV rating of 5 to 6.
- 02
- 03 UV-C is most effective at sterilizing when in "C" band range of 200-280nm. UV light then breaks apart the molecular bonds of the DNA of the microorganism killing the microbe or inhibiting its' ability to reproduce. (Upon request)
- 04
- 05 Heating element - Coronavirus gets deactivated due to melting of the outer protein shell at high temperature (56 °C for 15 min) (referred from multiple scientific publications) (Upon request)

Cabinet construction
Pentapost design for high strength, PPGL sheet with 55% aluminium & 45% zinc for double protection, OR PPGI sheet, OR GI Sheet.

DEV with Axial Fan



STAGES

HEPA filter with filter class as H14 (EN1822) with efficiency of 99.999%

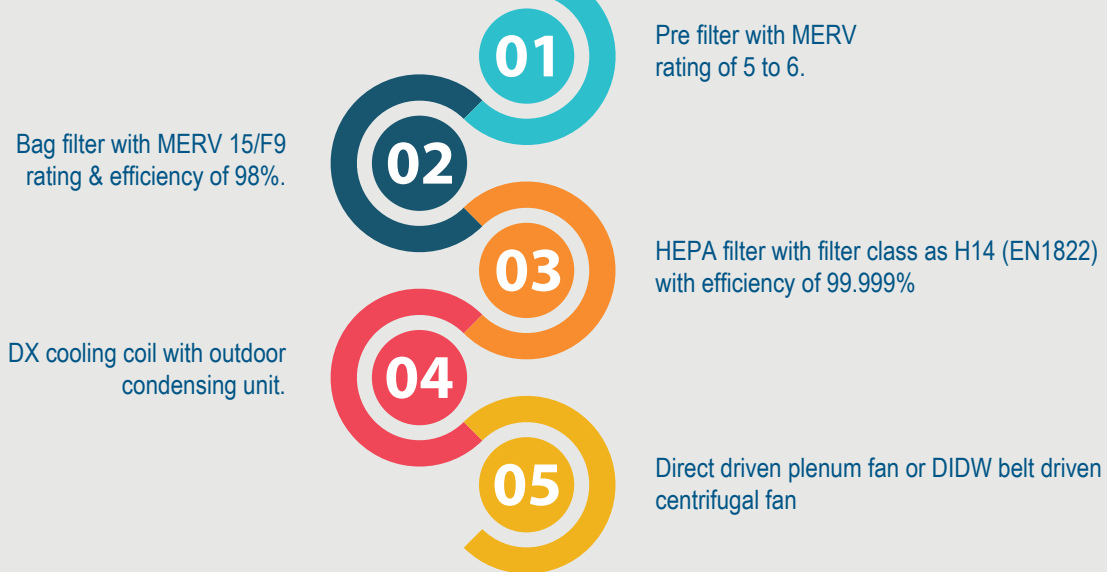
Direct driven low noise Axial fan with VFD for varying ventilation needs

- 01 Pre filter with MERV rating of 5 to 6.
- 02
- 03 UV-C is most effective at sterilizing when in "C" band range of 200-280nm. UV light then breaks apart the molecular bonds of the DNA of the microorganism killing the microbe or inhibiting its' ability to reproduce. (Upon request)
- 04
- 05 Heating element - Coronavirus gets deactivated due to melting of the outer protein shell at high temperature (56 °C for 15 min) (referred from multiple scientific publications) (Upon request)

Cabinet construction
Pentapost design for high strength, PPGL sheet with 55% aluminium & 45% zinc for double protection, OR PPGI sheet, OR GI Sheet.

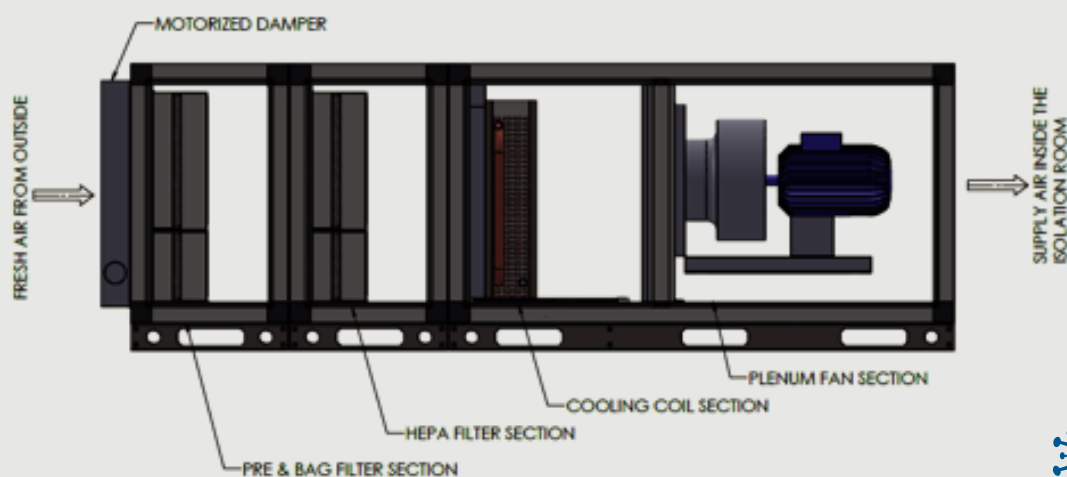
DAH For Fresh Air

STAGES



Cabinet construction

Penta post design for high strength, PPGL sheet with 55% aluminium & 45% zinc for double protection, OR PPGI sheet, OR GI Sheet. Mechanical performance tested as per EN 1886 from TUV lab.



Flow Visualization In Isolation Room

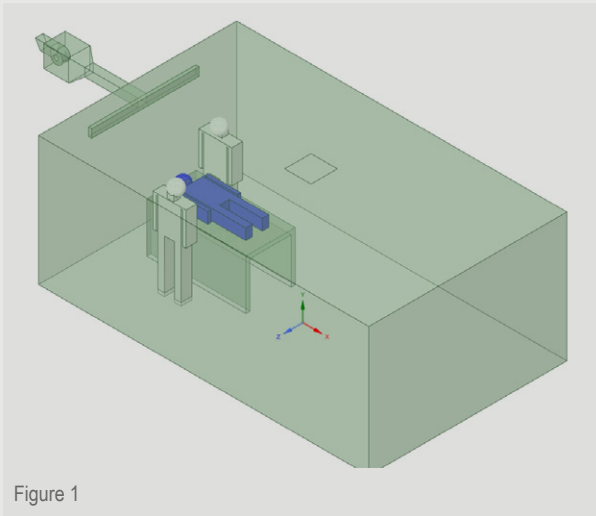


Figure 1

To investigate the dynamics of the ventilation and the airborne contamination in the conditions of a patient who was coughing and breathing.

The room has roughly 16 m² floor space and 2.6 m ceiling height, with a drop ceiling in part of the room.

- Maintain negative pressure inside the isolation rooms
- To prevent contamination air to the surroundings
- Filtered exhaust to avoid spread of virus

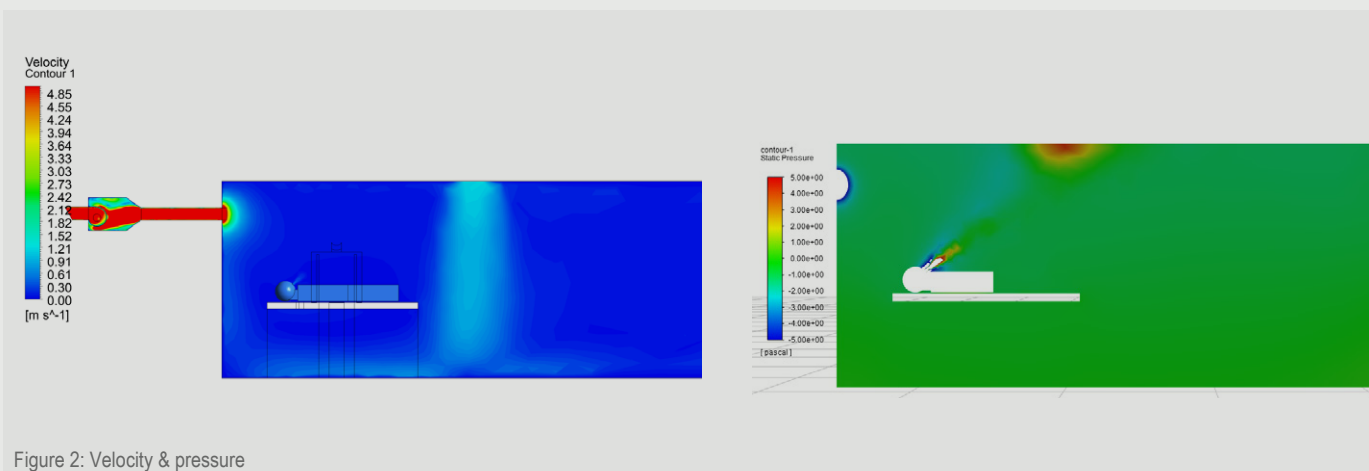


Figure 2: Velocity & pressure

The total supply air specified based on the 12 ACH. The one square diffuser placed on the drop ceiling are designed as per the supply air capacity. The exhaust air passed through the exhaust grill at the top of the room. The isolation room is assumed to control under negative pressure with all doors closed. Our DYN AIR products shall be so sized that a negative pressure of $>2.5\text{Pa}$ is maintained inside the enclosure.

(Source: Removal of Airborne Contamination in Airborne Infectious Isolation Rooms, FEBRUARY 2019 ASHRAE JOURNAL)

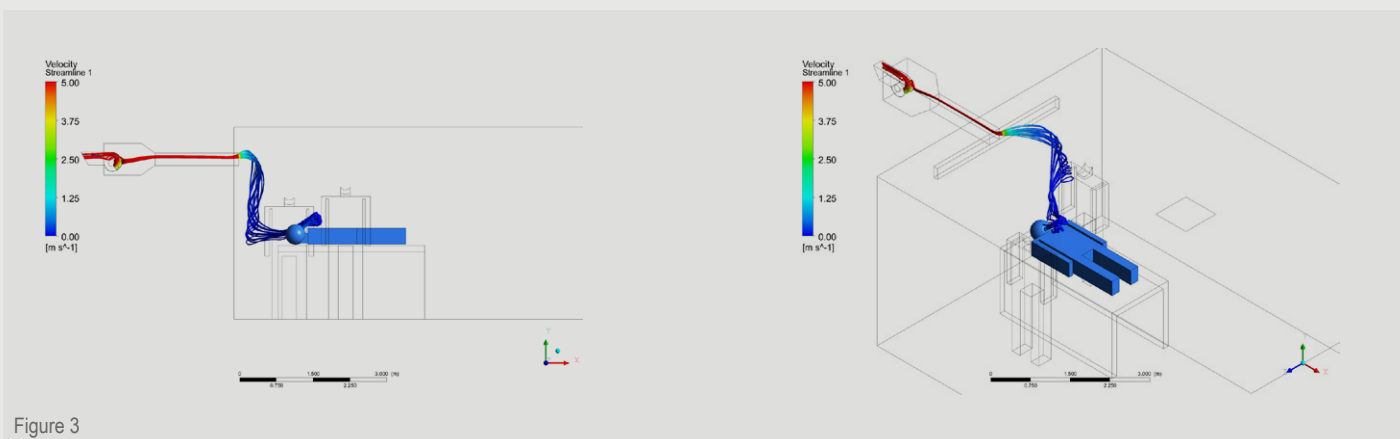
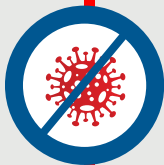
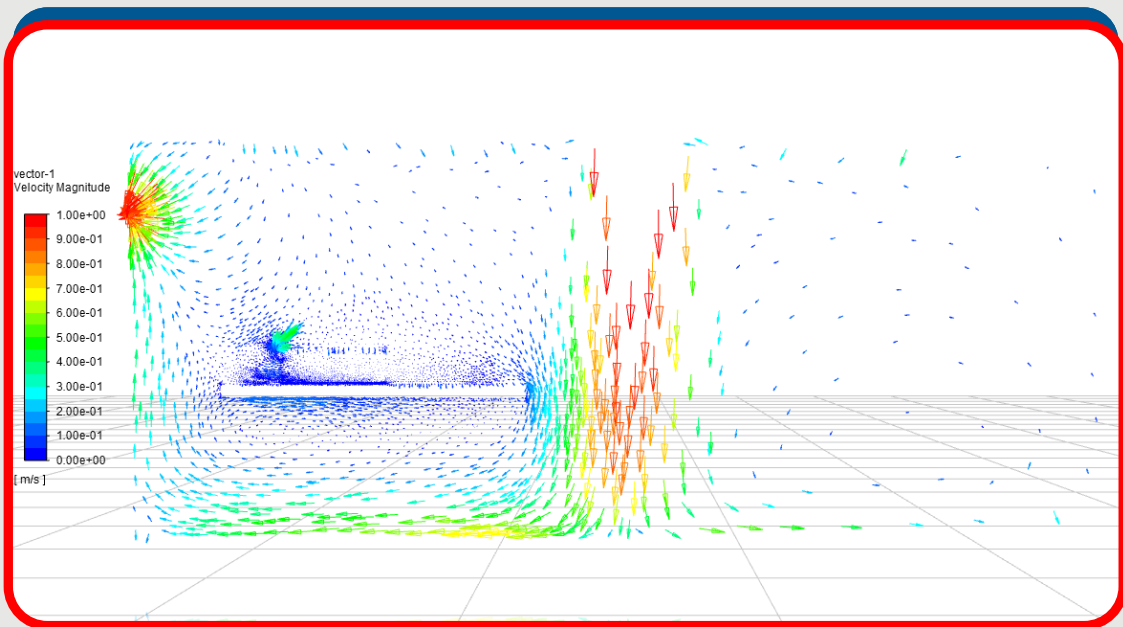
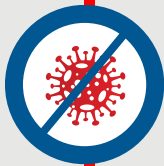


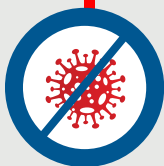
Figure 3



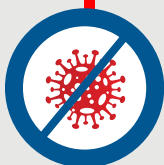
Computational results are presented in the form of color contour plots showing contaminated air distribution and vector plot.



Contours show the contamination released from the patient and the airflow distribution in the isolation room.



The chosen ventilation system influences the pollutant distribution and airflow patterns in isolation room.



We can support the design of the ventilation system for the optimum exhaust of contaminated air inside the isolation room / airborne rooms to reduce the risk for the health workers / our customer / end-user ETC.





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