

THE LAB CYCLE

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SCIENCE SPEAKS

The Global Combat Against the COVID-19 Pandemic

The Coronavirus Disease (COVID-19) is now a global pandemic and has been declared a Public Health Emergency of International Concern (PHEIC). As the spread of COVID-19 continues, the World Health Organization (WHO) encourages communities to reduce close contact between individuals and to cancel any unnecessary mass gathering events. Countries around the globe are also implementing measures such as national lockdowns, class cancellations, restaurant closures, public transit suspensions, all nonessential businesses, and mandatory 14-day quarantines for those who traveled in highly affected countries.

The official declaration of the pandemic by WHO has called on all countries to continue efforts that have been effective in limiting the number of cases and containment efforts aimed at inhibiting viral transmission. *Continue at page 2.*

IN THE BLUELIGHT

Equipment Spotlight: Biosafety Cabinet

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The World Health Organization (WHO) recommends handling COVID-19 samples in a properly maintained and certified Class II Biological Safety Cabinet (BSC).

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The Global Combat Against the COVID-19 Pandemic

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The official declaration of the pandemic by WHO has called on all countries to continue efforts that have been effective in limiting the number of cases and containment efforts aimed at inhibiting viral transmission.

UNDERSTANDING QUARANTINE AND SOCIAL DISTANCING

The disease has spread rapidly even though more than 33% of the world's population is under strict safety measures. Social and physical distancing is an important and effective way to slow down the spread of the disease. The term "social distancing" implies voluntarily keeping a few feet away from other people or choosing not to go to gatherings based on the recommendation of public health officials. It is the least restrictive—and the strategy that most authorities have largely recommended, particularly for vulnerable sectors of society.

According to the Centers for Disease Control and Prevention (CDC), droplets can travel as far as six feet; thus they recommend maintaining at least six feet distance. However, this is based on estimates of a range that have not considered the presence of a high-momentum cloud carrying the droplets to long distances.

Most people are advised to cooperate in keeping social distance to help flatten the curve. However, many still find it difficult to cope due to a lack of resources such as food, public transportation, and jobs. Up until now, countries are responding in vastly different ways to the COVID-19 pandemic. Aside from one common practice of putting passengers in quarantine after returning from so-called hot zones, citizens should only interact with their family members and work from home if possible.

To prevent the disease from spreading further, all public gatherings, including weddings and memorial services, were restricted. Quarantine exemptions include medical personnel and those who are transporting essential goods. Everyone else is only allowed to leave to purchase food or medication, go to the hospital, or go to banks.

The great unknown is whether the kinds of restrictions imposed in other countries are fitting to other nations that are greatly affected by the SARS-CoV-2. Governments all over the world are trying to figure out how to stem community contagion, which is currently widespread yet difficult to trace back to contain the infection rates.

With more than a hundred countries currently hit, the requirements needed to effectively quarantine the volume of people could overwhelm systems. The lockdown will only be partially eased after a month if case trends slow and decrease. The public should inculcate the idea that this is not an experiment or theoretical social construct. This is reality, and everyone has a role to play in mitigating the chains of transmission of COVID-19.

As most countries are extending the lockdown and quarantines, it is causing a shift in the global economic balance. Most businesses are dawdling in economic growth and are looking for reassurance. On the contrary, this pandemic is a reminder that all are connected and are not alone in this fight. Some countries have started sending test kits and masks to other countries that are now hustling to flatten the curve.

HEALTHCARE SYSTEM AMIDST THE PANDEMIC

Some countries have sufficient capacity in their healthcare system to handle the COVID-19 outbreak, while some are in crisis as well as with health workers. Doctors, nurses, responders, and housekeeping staff are at the frontlines of this pandemic. Without the assurance that they can safely do their jobs, many are getting infected, hospitalized, and succumbing to the disease.



Whether in hospitals, clinics, or urgent care settings, each must adopt best practices to conserve Personal Protective Equipment (PPE) and other supplies including the implementation of administrative controls and workflows. These are fundamental pillars of crisis standards of care. Preventing the spread of COVID-19 in a healthcare setting requires proper facilities. Laboratories performing research on COVID-19 should strictly implement the appropriate biosafety practices. Following the biosafety guidelines of the CDC, laboratory workers should wear complete PPE including disposable gloves, laboratory coat/gown, fit-tested N95 respirator, and eye protection when working with infectious materials. Generally, in diagnostic and healthcare settings (e.g. hospital-based, clinical and public health), laboratories must be at least Biosafety Level 2 or above.

Figure 1. A Biosafety Level 2 (BSL-2) Facility.
Image source: WHO Laboratory Biosafety Manual, 3rd edition

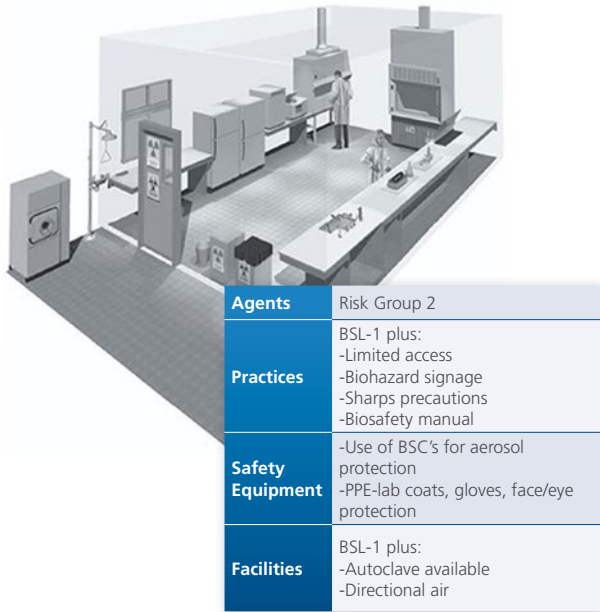
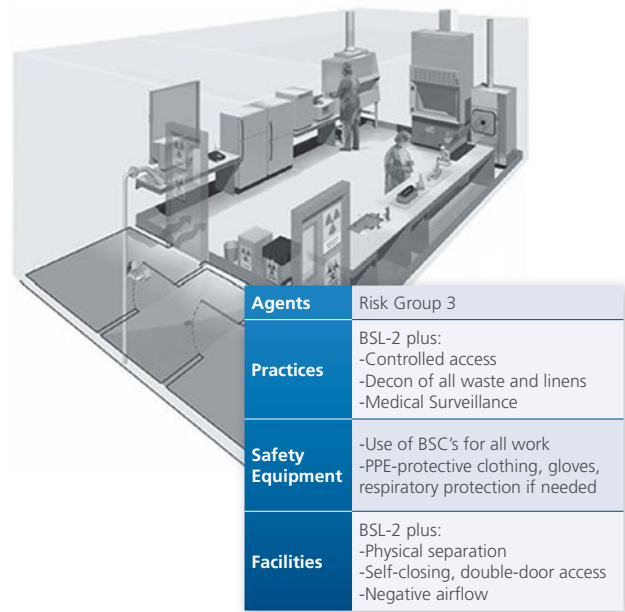


Figure 2. A Biosafety Level 3 (BSL-3) Facility.
Image source: WHO Laboratory Biosafety Manual, 3rd edition



According to CDC, both Biosafety Level 2 and 3 laboratories can satisfy the laboratory setup requirements of handling the SARS-CoV-2.

Aside from biological safety cabinets, other laboratory equipment on BSL 2 and 3 facilities should also be provided not just to protect the personnel and samples but also to offer a solution on the ongoing quest for COVID-19 anti-viral treatment. Biosafety cabinets are mainly used for containing infectious droplets or aerosols from microbiological procedures. Esco has designed a biosafety cabinet guaranteed to protect the operator and environment from pathogenic biological agents while providing a sterile environment for the sample.

Terrifying as the COVID-19 may be, it very well may be turned around. With steadfast efforts, the contagion can be pulled to a halt. There is a chance to stop the coronavirus and as time goes by, everyone must continue to participate in ending this pandemic.

References:

[1] Centers for Disease Control and Prevention. September 29, 2017. Isolation and Quarantine. www.cdc.gov/quarantine/index.html

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[6] Centers for Disease Control and Prevention. (2020). Interim Laboratory Biosafety Guidelines for Handling and Processing Specimens Associated with 2019 Novel Coronavirus (2019-nCoV). www.cdc.gov/coronavirus/2019ncov/lab/labbiosafetyguidelines.html CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Ftab-biosafety-guidelines.html

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COVID-19 Solutions: Equipment Guide for SARS-CoV-2 Detection

With the on-going fight against the COVID-19 pandemic, more facilities are upgrading order to perform assay and conduct testing. As recommended by the WHO, all non-propagative diagnostic laboratory work including sequencing and Nucleic Acid Amplification Tests (NAAT) must be done in a Biosafety Level 2 facility. Proper laboratory equipment must be used during storage, initial specimen processing, and analysis.

Esco continues to provide assistance and world-class solutions by manufacturing and supplying vital equipment needed in the crisis. Here's a quick guide of equipment reference for SARS-CoV-2 detection.



STORAGE

Specimens are recommended to be stored at 2-8°C for up to 72 hours after collection. If delay in testing or in shipping occurs, specimens should be stored at -70°C or below. As for the assay or kit reagents, follow indicated storage instructions, some may require 4°C or -20°C.

Esco refrigerators and freezers are designed for laboratory use, offering superior product protection with long-term reliability and exceptional quality for sensitive and precious samples across clinical and research applications.

SAMPLE HANDLING

Initial processing of specimens should be handled in a primary containment device such as well-maintained and certified Class II Biological Safety Cabinet.

The Airstream® Class II Biosafety Cabinet is designed to handle pathogenic biological samples. This cabinet has an inflow for operator protection, an ULPA-filtered downflow which creates an ISO Class 3 work surface and prevents cross-contamination for sample protection and an ULPA-filtered exhaust for environment protection.

SAMPLE PREPARATION

Micropipettors, micro centrifuges, and microplate shakers are required in reagent setup and in carrying out RNA extraction for COVID-19 testing.

A micro centrifuge is used to yield reliable nucleic acid pellet. Its aerosol-tight rotor helps prevent bioaerosol generation. Esco's Versati™ micro centrifuge has a speed of up to 15,000 rpm and is equipped with safety features including lid lock, audible and visible notification system, and over-temperature detection which provides sample protection to prevent sample damage.

Microplate shaker/incubator is designed for a wide variety of mixing applications for accurate incubation of reaction and denaturation of nucleic acids and proteins. ProvoCell™ combines an advanced microprocessor-based controller with Peltier heating and cooling to deliver outstanding reliability, safety, and overall performance.

DETECTION AND ANALYSIS

PCR cabinets provide DNA and RNA contaminant-free environment through HEPA filtration and UV decontamination system. The cabinet provides clean airflow to keep PCR mastermixes clean and free from potential nucleic acid contaminants.

Prepared samples are transferred in a microplate and placed inside a real-time reverse transcription PCR detection system to duplicate and amplify the genetic material. This process will amplify and detect the presence of the viral gene to confirm if the patient is COVID-19 positive.



When there is a viral genetic material in the samples, amplification occurs, releasing enough fluorescent markers to be detected.



When there is no viral genetic material in the sample, amplification will not occur, and no fluorescent markers will be detected.

REMINDERS:

- Complete and proper PPE must be worn.
- Laboratory personnel should be properly trained and knowledgeable in handling specimens, in using various equipment, and in interpreting results.
- Follow guidelines set out by World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC).



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- [1] JAMA Network. April 2020. Testing Individuals for Coronavirus Disease 2019 (COVID-19). jamanetwork.com/journals/jama/fullarticle/2764238
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Equipment Spotlight: Biosafety Cabinet

Testing laboratories are taking appropriate measures to prioritize the safety of the laboratory professionals while doing their duty in battling the Coronavirus Disease (COVID-19) pandemic. The laboratories carrying out COVID-19 testing must have the appropriate equipment and facility required to protect the lab personnel while conducting the tests. The World Health Organization (WHO) recommends handling COVID-19 samples in a properly maintained and certified Class II Biological Safety Cabinet (BSC).

Biosafety cabinets pose great importance in handling biohazards in COVID-19 testing facilities. Specimens collected from suspected individuals will undergo procedures with high risk of aerosolization, therefore are recommended to be done in a BSC. The direction and velocity of the airflow inside the biosafety cabinet create an air barrier between the specimen and the operator, minimizing the risk of exposure to hazardous bioaerosols.

Esco's Class II Biological Safety Cabinets have been chosen by various laboratories, hospitals, and testing facilities all around the world. Government and private organizations across countries have entrusted us to provide safe and reliable equipment to the COVID-19 testing facilities in their respective regions.

We are honored to do our share and express our support and assistance to some of our beneficiaries by offering our biosafety cabinets to help suffice the needs of their on-going study. Not long ago, we provided a Labculture® Biological Safety Cabinet to the CDC system of Hubei and two more units to The First Affiliated Hospital of Guangzhou Medical University.

We are beyond grateful that our BSCs are being presented and featured in several news and media outlets.

Esco will continue to respond to the needs of our customers in the healthcare industry. This pandemic will not hinder us from providing quality equipment to uphold biosafety for the heroes of the society: hospital staff, nurses, medical technicians, doctors, scientists, pharmacists, and everyone who works to cease this virus.

We are with you in fighting this pandemic! Let us look out for each other.



References:

- [1] Interim Laboratory Biosafety Guidelines for Handling and Processing Specimens Associated with Coronavirus Disease 2019 (COVID-19), March 2020. <https://www.cdc.gov/coronavirus/2019-nCoV/lab/lab-biosafety-guidelines.html>.
- [2] Laboratory biosafety guidance related to the novel coronavirus (2019-nCoV), February 2020. https://www.who.int/docs/default-source/coronavirus/laboratory-biosafety-novel-coronavirus-version-1-1.pdf?sfvrsn=912a9847_2.

ASIA



Bangladesh - Bangabandhu Sheikh Mujib Medical University

Source: Prothom Alo – largest newspaper in Bangladesh



Bangladesh - Rajshahi Medical College Hospital

Source: SOMOY TV – Bengali news television channel



Malaysia – Ampang Hospital

Source: Media Prima Berhad



Philippines – Lung Center of the Philippines (LCP)

Source: Department of Health (DOH)



Thailand - Centers for Disease Control and Prevention (CDC) in Thailand

Source: CDC Global

AFRICA



Nigeria - Aminu Kano Teaching Hospital

Source: Chikwe Ihekweazu, Director General, Nigeria Centre for Disease Control

EUROPE



United Kingdom - The Native Antigen Company

Source: CNA Insider, The Search For A Covid-19 Vaccine Race Against Pandemic

NORTH AMERICA



New Jersey - Hackensack Meridian Health Center

Source: KXAN-TV

SOUTH AMERICA



Brazil – Butantan Institute

Source: Governo do Estado de São Paulo

Challenging Times Require Noble Service

Dr. Tedros Adhanom Ghebreyesus, World Health Organization (WHO) director-general said that containment should be the central pillar of any comprehensive approach in the combat COVID-19. One essential strategy is the detection of COVID-19 positive patients to enable contact-tracing, isolation, testing, and treatment. Prior to these tests, healthcare facilities must be fully equipped and prepared.

The WHO's interim on laboratory safety specified that processing of all specimens must be done in a properly maintained and validated Class II Biological Safety Cabinet (BSC). Validation ensures the optimal running condition of the equipment. Tests conducted include the checking of inflow velocity, downflow velocity, filter integrity, light intensity, noise level, UV light intensity, smoke pattern, site installation and alarms. These procedures are carried out by trained and certified service engineers equipped with calibrated instruments and personal protective equipment.

Cabinets that are not validated pose a risk of biohazard exposure due to:	Validated cabinets ensure the following for effective containment of biohazards:
<ul style="list-style-type: none"> - imbalance inflow and downflow speed - loaded filter incapable of filtration - incorrect airflow pattern - improper equipment placement - alarm malfunctions 	<ul style="list-style-type: none"> - correct inflow and downflow speed - filter is capable of filtration - correct airflow pattern - proper equipment placement - functional alarms

Our very own Esco service engineers have been out on the field to check, assess, and certify biosafety cabinets and PCR cabinets of any brand. They help medical frontliners deliver their duties by ensuring safe-running equipment despite the impending risks.



**We VALUE your commitment! May you be safe as you battle to keep the community safe!
Your Esco family is one with you.**

References:

- [1] WHO (March 2020). WHO Director-General's opening remarks at the Mission briefing on COVID-19. <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-mission-briefing-on-covid-19---12-march-2020>
- [2] WHO (February 2020). Laboratory biosafety guidance related to coronavirus disease 2019 (COVID-19). <https://apps.who.int/iris/bitstream/handle/10665/331138/WHO-WPE-GIH-2020.1-eng.pdf>

Esco Launches the CelCulture® CO₂ Incubator with High Heat Sterilization



Esco is proud to announce the launch of Esco CelCulture® CO₂ Incubator with High Heat Sterilization (CCL-HHS). This new product adopts a 180°C dry heat sterilization system, proven effective in killing normally resistant fungi, bacterial spore, and vegetative cells that may contaminate the workspace. This sterilization cycle is more convenient as it eliminates the need to remove chamber components during sterilization and completes within 12 hours leaving the chamber cool and dry at the end of the cycle (see figure 1).

CCL-HHS is designed for high-quality incubation performance through the precise control of heating and gas injections combined with multiple contamination control and ergonomic features appropriate for safe incubation of many types of cells and tissues. Its external body is made of electro-galvanized steel coated with silver-ion impregnated Isocide™ antimicrobial powder which kills 99.9% of surface contaminants within 24-hours of exposure. The incubator chamber is stainless steel type 304 with rounded corners for easy cleaning. Its perforated shelves, plenum, and humidity pan are also made stainless steel (see figure 2). The interior components can be easily removed without using any tools.

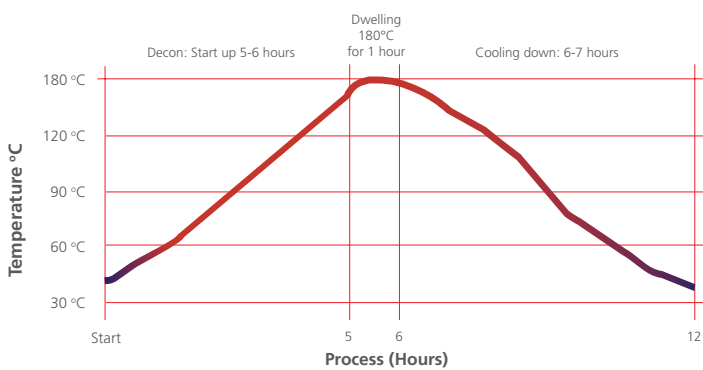


Figure 1. Graph of temperature during full cycle sterilization. 180°C High Heat Sterilization Cycle completes within 12 hours.



Figure 2. Stainless Steel Interior Chamber of CelCulture® CO₂ Incubator with High Heat Sterilization (CCL-HHS)

Heater foils directly mounted on the outer surfaces of the inner chamber help maintain a relatively uniform temperature with fast recovery time after door opening. A high-density insulation completely protects the heating elements. It is then surrounded by an air jacket which separates the chamber from the varying ambient conditions (see figure 3).

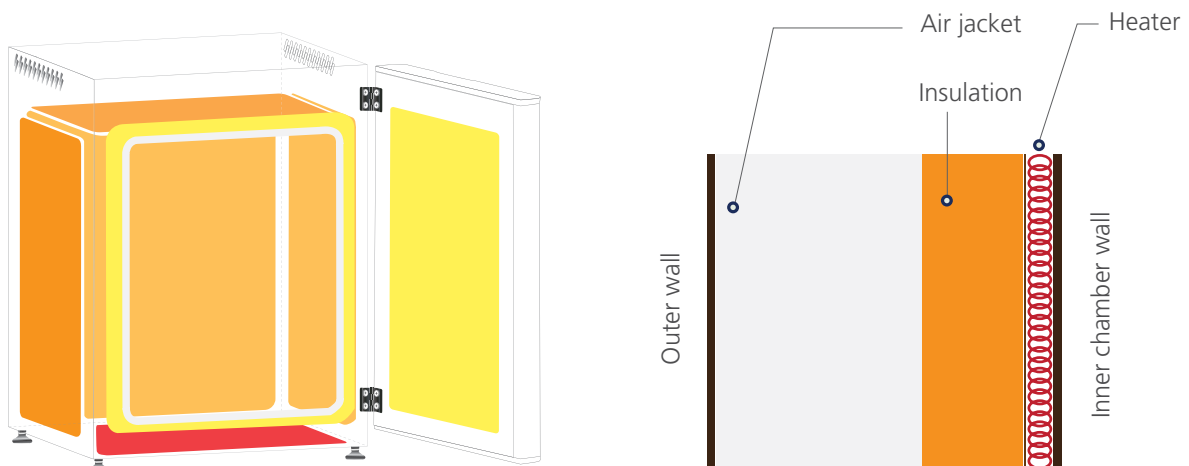


Figure 3. Direct Heat and Air Jacketed. Direct heating enables rapid temperature recovery while air jacket provides isolation against ambient temperature fluctuations.

The unit is equipped with a drift-free, non-dispersive infrared sensor which has temperature and pressure compensating feature for longer-lasting reliability. Forced convection design accelerates humidification via humidity pan to prevent desiccation of cell samples. A filtration system, which is 99.999% efficient at 0.1 to 0.3 microns (see figure 4), is connected to the blower to ensure proper circulation of an ISO Class 5 clean air standard without negatively affecting cell growth. It is attached to a blower fan to ensure proper circulation of clean air and equal distribution of heat and gas at any point in the incubator chamber (see figure 5).

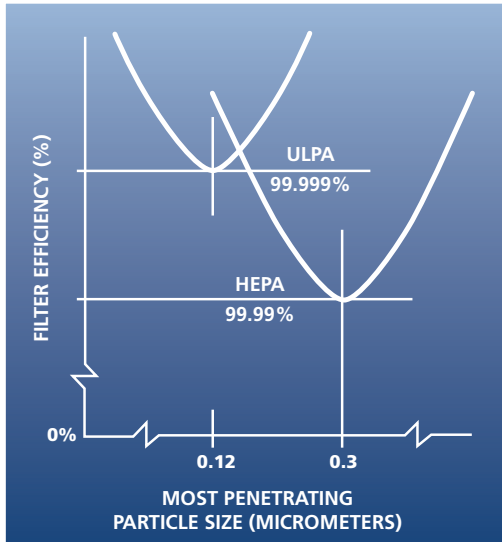


Figure 4. ULPA Filtration System. ULPA has 10x more filtration efficiency than HEPA filter for a cleaner and safer chamber atmosphere.

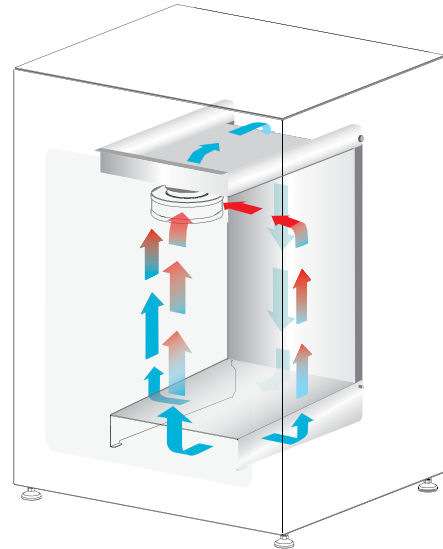


Figure 5. Ventiflow™ Forced Convection System. Blower automatically stops when door is opened to minimize mixing of chamber and room air.

Given the precise measurement, control of temperature, and CO₂ level, as well as the multiple contamination control methods of CelCulture® CO₂ Incubator, it is especially suitable for growing mammalian cells at 37°C and in the presence of 5% CO₂.

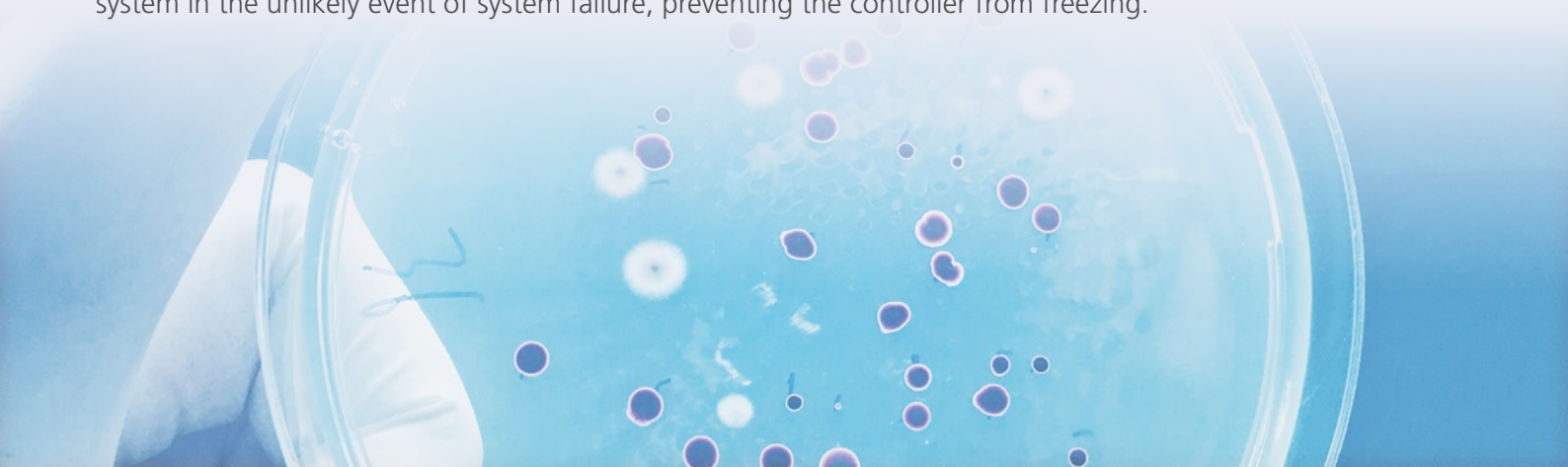
More New Features to Look Forward to!

The Esco CelCulture® CO₂ Incubator with High Heat Sterilization is equipped with heat-resistant sensors. These highly accurate sensors are resistant to high temperature, providing accurate and stable measurements. With its resistance to high temperature, these sensors are not to be removed during sterilization process which provides hassle-free sterilization cycle.

The Temperature Fail-Safe System with its over-temperature protection device prevents overshooting of temperature to + 0.4°C of the set point.

Another innovative feature for CCL-HHS is the %CO₂ Failure Mode Protection. The advantage of %CO₂ Failure Mode Protection is that it prevents the buildup of %CO₂ over set point in cases of CO₂ sensor defect. The system will automatically stop the valve from injecting CO₂ after a certain period. When %CO₂ is maintained throughout the operation even with CO₂ sensor defect, cell samples will survive.

Lastly, the CCL-HHS model is also equipped with Watchdog Failure System Mode that will automatically reset the system in the unlikely event of system failure, preventing the controller from freezing.



Upcoming Esco Product Selector Apps: Just Tap and Go

Esco's goal is to provide enabling technologies which help make human lives easier and safer by manufacturing world-class laboratory equipment. In line with this vision, Esco is currently developing Product Selector Applications that help you choose the right equipment that best meet your needs. With these precise and accurate solutions, purchasing equipment will be a hassle-free experience.

Accessible through mobile devices, these applications are designed to recommend the most suitable Esco product model with just a few taps, making it an ideal tool for our valued customers. You will find exciting features that are developed for everyone's convenience. Each Esco laboratory product will have its own selector application and can be downloaded free of charge from the Apple App Store and Google Play Store.

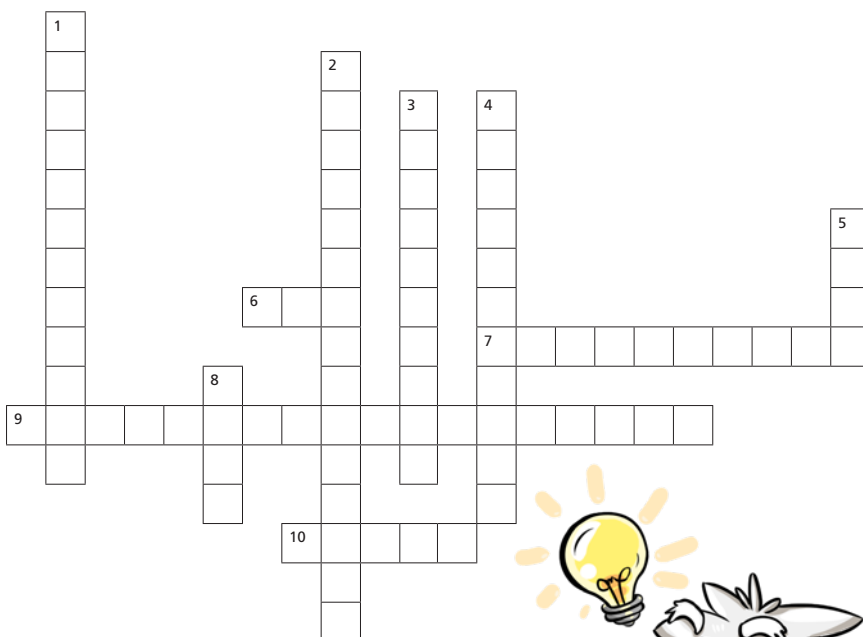
With an indicative offer at your fingertips, you can now save time and effort by just scrolling from your smartphone, iPad, or tablet.

COMING SOON!



EINESCO'S ZONE

Pandemic Puzzle



Answers will be revealed on the next issue.



DOWN

1. Equipment with a temp. range of 2-15°C used for sample storage
2. Equipment that spins small amount of liquids at high speed to separate components
3. Right type of biosafety cabinet to be used for handling COVID-19 test samples
4. According to the World Health Organization, _____ with soap and water is the most effective way to prevent COVID-19 spread
5. Biocontainment designation level for COVID-19 testing
8. Wear a _____ if coughing or sneezing

ACROSS

6. First line of protection against biohazards
7. Name of virus that causes the COVID-19
9. Official name of COVID-19
10. Province in China where the first case of the disease occurred

How to Properly Wear a Mask?



A PROPERLY WORN MASK PREVENTS THE DROPLETS FROM BEING PASSED INTO THE AIR WHEN YOU COUGH OR SNEEZE. HERE ARE THE CORRECT WAYS TO WEAR A PROTECTIVE MASK:



STEP 1: MAKE SURE TO HOLD THE MASK ON THE STRAP AND AVOID TOUCHING THE SURFACE



STEP 2: MAKE SURE THAT THE COLORED SIDE OF THE MASK IS FACING OUTWARDS



STEP 3: POSITION THE ELASTIC STRAP (EAR-LOOP TYPE) AROUND BOTH EARS



STEP 4: MOLD THE METALLIC STRIP OVER NOSE BRIDGE AND THE MASK SHOULD FIT SNUGLY OVER THE FACE



STEP 5: EXTEND THE MASK TO FULLY COVER MOUTH, NOSE, AND CHIN

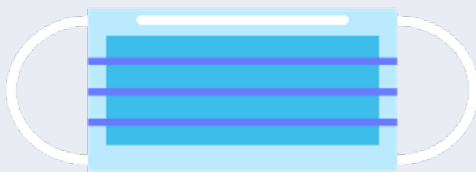


STEP 6: AVOID TOUCHING THE MASK AFTER WEARING

BE SOCIALLY RESPONSIBLE. STOP THE SPREAD OF DISEASES.

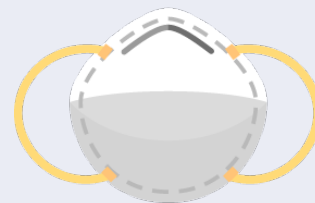
HOW HELPFUL ARE FACE MASKS? It provides a physical barrier to fluids and large particle droplets.

SURGICAL MASKS



Surgical masks can prevent infections transmitted by respiratory droplets. Such masks trap large particles of body fluids that may contain bacteria or viruses expelled by the wearer. It provides a degree of protection against fluids, including spray from a cough or sneeze, and they provide some filtration of the air.

RESPIRATORS



Respirators or N95 masks are designed to reduce one's exposure to airborne contaminants. These offer the best protection for those who must work closely (either in contact with or within 6 feet) with respiratory symptoms. They're heavy-duty and are form-fitted to your face. It filters out about 95% of airborne particles including viruses and bacteria.