Application Note #20

Chlorine dioxide gas and Class III BSCs by Clordisys

The Class III Biological Safety Cabinet (BSC) is a gas-tight enclosure designed for work with highly infectious microbiological agents and for the conduct of hazardous operations and provides maximum protection for the environment and the worker.

A Class III BSC is typically decontaminated on a periodic basis and always before filter change out and repairs. Formaldehyde and chlorine dioxide gas are the only approved decontamination methods by NSF International. Before chlorine dioxide gas, the previous method for decontamination was using formaldehyde to attain a 6-log sporicidal kill. This method was effective but typically took over 12 hours to complete the process. The carcinogenic effects and formation of residues were also a concern with formaldehyde. Chlorine dioxide gas provides a much quicker decontamination time, is not a carcinogen, and does not leave a residue. Due to that, chlorine dioxide gas is now the method of choice for the decontamination of Class III BSCs.

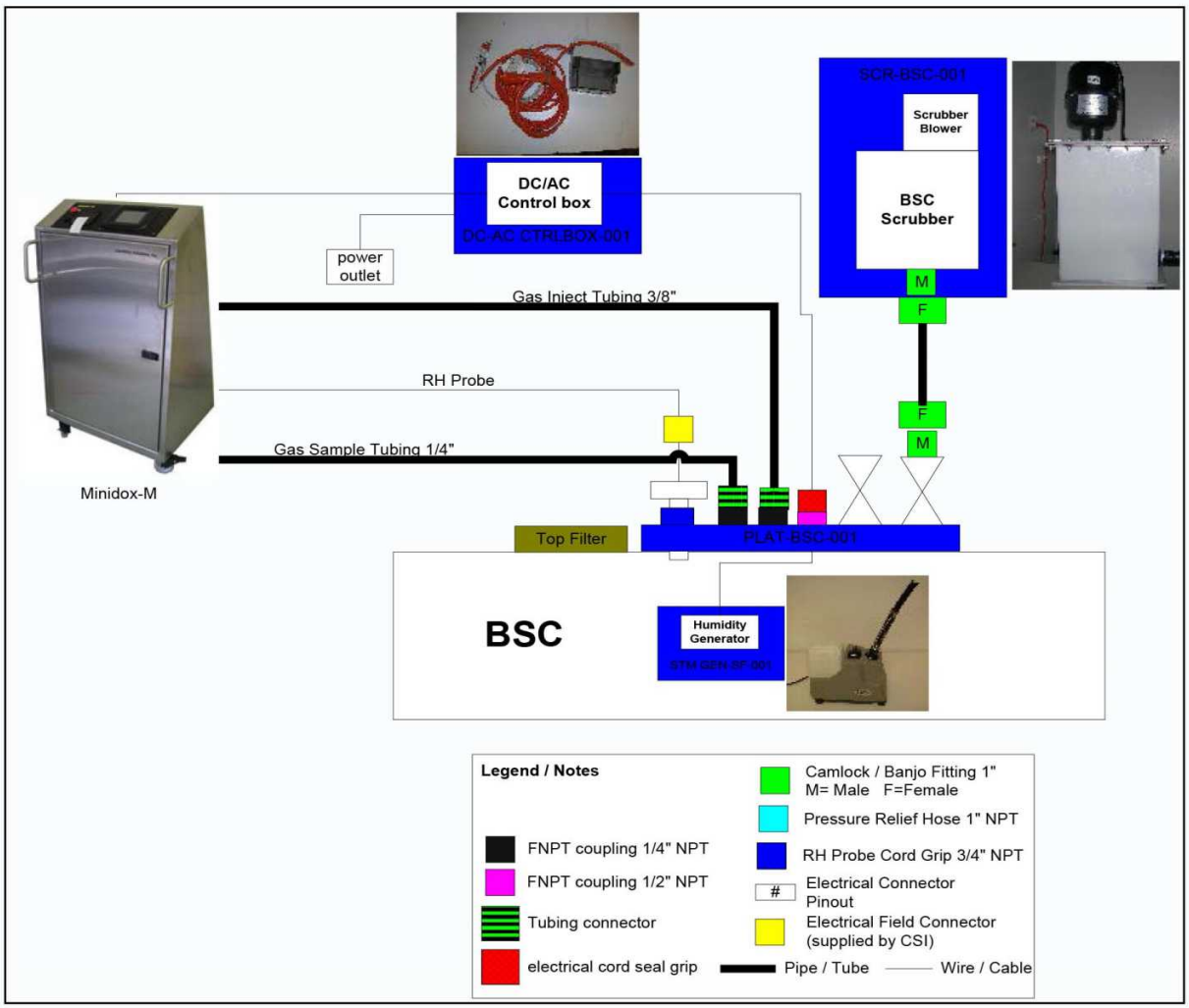
Equipment Required:

The equipment required to decontaminate a Class III BSC consists of:

- Minidox-M/Cloridox-GMP Portable CD Generator.
- BSC connection plate or proper ports on the BSC.
- Carbon Scrubber System (Optional)

Equipment Setup:

The setup of the equipment varies for each system. The following shows the setup for a BSC without recirculation using the Minidox-M and using a carbon scrubber for chlorine dioxide gas removal.



Equipment Operation:

The operation of the equipment for a ClorDiSys CD gas generator utilized to decontaminate Class III BSC is as follows:

Make all appropriate physical connections.

1. Class III BSCs typically come with couplings or ports that can be utilized by the Minidox. If these ports do not exist then a plate containing the couplings can be installed either permanently or temporarily.
    a. The required ports are two ¼" FNPT for gas injection and gas sampling, two ½" FNPT for the RH / Temp probe and steam power cord grips, and two 1" FNPT for valves to let fresh air and transfer gas to a scrubber.
2. Place a small steamer inside of the BSC and the RH / Temp probe through a cord grip so that at least its tip is within the BSC. These items often stay in place between cycles.
3. Plug the DC/AC control box into an outlet and the steamer into the DC/AC control box. A section of the power cord between the control box and steamer will be passed through the second cord grip
4. Connect the two M-12 cables (small 4 pin connector) from the back of the Minidox to the corresponding cables on the RH / Temp probe and DC/AC control box.
5. Use ¼" Kynar tubing to connect the Minidox sample port to the BSC sample port.
6. Use 3/8" tubing to connect the Minidox gas injection port to the BSC injection port.
7. Use 1 ¼" hosing to connect the gas outlet of the BSC to the scrubber.

The normal sterilization process is automated and consists of 5 steps:

1. Precondition: Raising of humidity to make spores susceptible to gas.

    This is achieved by using the RH probe in the loop to read humidity and then turning on the steam generator located in the mix box as needed to adjust the RH.

2. Condition: Holding of raised humidity level for spore softening.

3. Charge: Injection of gas into chamber

    This is achieved by injecting CD gas into the CD Gas Inject Tee until the photometer measures that the concentration is reached.

4. Exposure: Holding of gas concentration for the set amount of time.

5. Aeration: Expulsion of gas and humidity. For ducted BSC's, this is simply accomplished by turning on the exhaust blower and opening the infeed and exhaust dampers on the BSC. For non-ducted BSC's, this is accomplished by using a carbon scrubber to break down the CD gas. This method aerates the BSC in under an hour.

Comments/Notes:

The above is one method of interfacing a Minidox with a Class III BSC. Ther are a variety of other ways to accomplish this that can be discussed by calling us