ClorDiSys

"The Chlorine Dioxide People"

Providing you with chlorine dioxide solutions for your decontamination needs

Application Note 32: Camfil Hot Test Unit Decontamination

General:

HEPA Housings are an integral part of any containment laboratory to keep both the internal and external environments safe from harmful contaminants. On the Supply side, they are purifying the incoming air to maintain sterility for a clean facility. On the Exhaust side, they are purifying the air exhausting from a facility that works with biologically hazardous organisms in order to prevent their escape. Periodically it is necessary to test the efficiency of these units which involves laboratory downtime in order to decontaminate the unit before access to the HEPA can be allowed for a filter test or a filter changeout. The Camfil Mobile Media Tester allows for "hot testing" (testing while the HEPA is in operation) and subsequent decontamination of the testing unit to allow for both filter validation and safe decontamination of the testing unit all without taking the HEPA out of operation. This ensures the integrity of the system without allowing any cross contamination between the other housing units. This is ideal for work within BSL-3 and BSL-4 labratories and any other area where high level environmental control is necessary.

Being a true gas, chlorine dioxide is an ideal decontaminating agent for this application allowing it to easily penetrate into all the areas inside the tester. Chlorine dioxide gas can travel large distances (well over 500 ft) without any adverse effects or concentration loss and without the need for any special installation requirements such as delivery piping insulation. This makes it an ideal agent for high-containment applications since the generator can be housed outside of these hazardous environments and the laboratory or suite can be decontaminated by personnel while outside of containment.

ClorDiSys' Minidox-M Chlorine Dioxide Gas Generator is currently the only system validated to decontaminate the Camfil Mobile Media Tester. These combined systems are currently being utilized at high containment laboratories around the world, allowing them to run safer and more efficiently.

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Chlorine Dioxide Gas Decontamination Steps:

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. The Valve Control Module then cycles through each internal flow path inside the Camfil Hot Test Unit to ensure all tubing sees the proper Rh level.

3. **Charge:** Injection of gas into chamber
   This is achieved by injecting CD gas into the Mix Box until the photometer measures that the concentration is reached.

4. **Exposure:** Holding of gas concentration for the set amount of time. The Valve Control Module then cycles through each internal flow path inside the Camfil Hot Test Unit to ensure all tubing sees the proper CD concentration.

5. **Aeration:** Removal of gas and humidity. This can be accomplished by exhausting the gas through the activated carbon scrubber system.

Equipment Required:

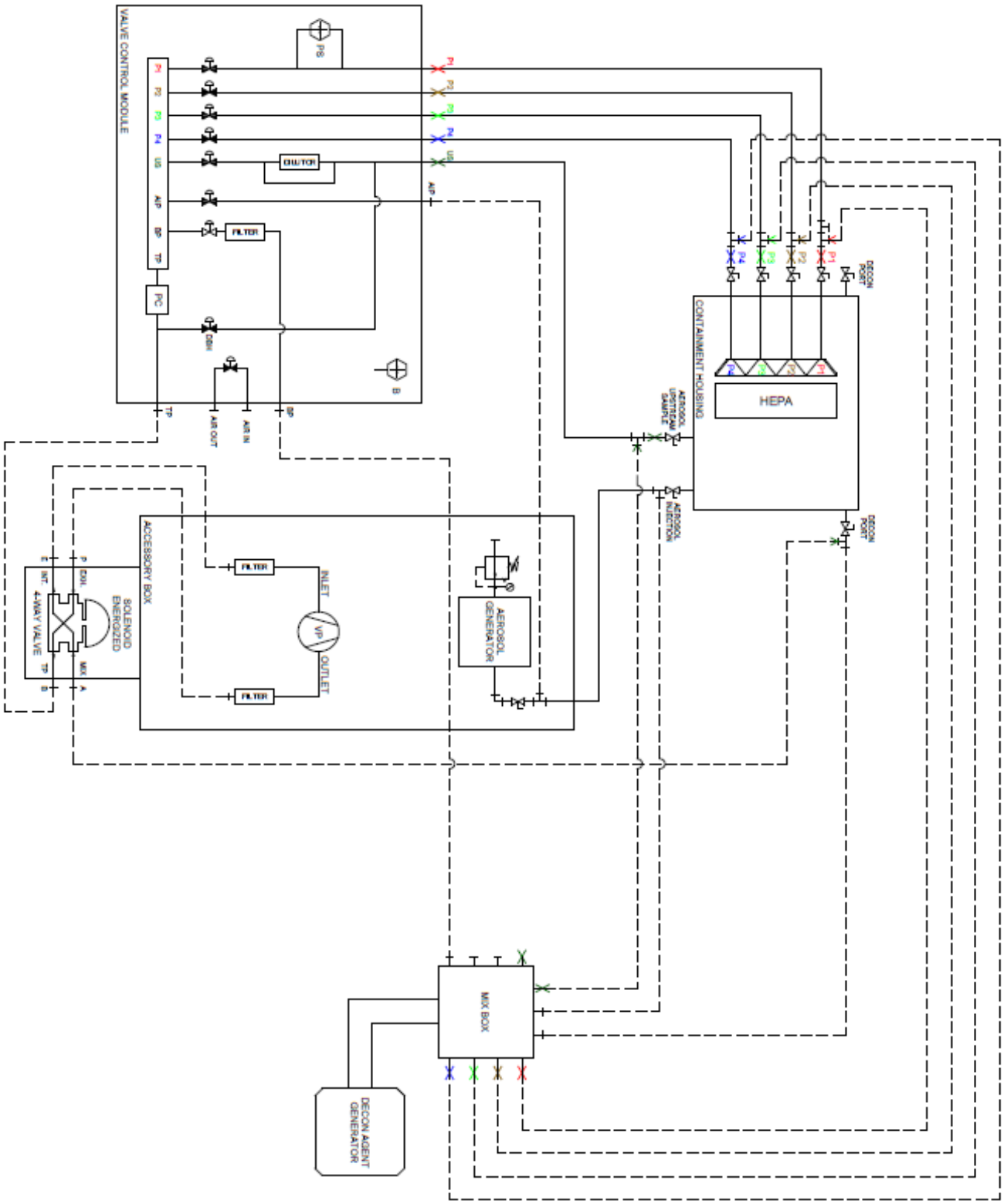
The equipment required to decontaminate the Camfil Mobile Media Tester consists of:

- Minidox-M/Cloridox-GMP Portable CD Generator
- Camfil Post Hot Test Unit
- Camfil Valve Control Manifold which diverts the CD gas through each flow path of the Hot Test Unit
- Mix Box which provides a reservoir for the CD gas
- Carbon Scrubber which breaks down the CD gas

Equipment Setup and Operation:

(*Please refer to the following page for a diagram of the combination of Minidox and Post Hot Test setup*)

The operation of the equipment for a ClorDiSys CD gas generator utilized to decontaminate Camfil's Post Hot Test unit from remote decontamination ports is as shown in the diagrams below:



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ITEM NO.	PART NUMBER	DESCRIPTION	QTY. EA.
1	M-BOX-DOOR-ASM	REQUISITION	1
2	9157K25	1" Pipe Nipple, Threaded One End, w/ Tapped Hole	2
3	M35002073	COUPLER, 25KAAN13RVX8 - RED	1
4	M35002074	COUPLER, 25KAAN13RVX3 - BROWN	1
5	M35002075	COUPLER, 25KAAN13RVX6 - BLUE	1
11	M35002076	COUPLER, 25KAAN13RVX0 - GREEN	1
7	M35002077	COUPLER, 21KAAN13RVX0 - GREEN	2
8	M35002611	HOSE P-TO-C SOCKET 1/4"NPTF MALE TO 1/4"CPLG MC#6718K91	4
9	M35002612	HOSE P-TO-C PLUG 1/4"NPTF MALE TO 1/4"CPLG MC#6718K26	2
10	M35001566	CPLG,HALF 3/8" NPT 304/L	2
11	C35001565		10
12	M40020990		1
13	M40020992		1
14	M35002672		4
15	M40020991		1
16	M34002706		1
17	M34002705		1
18	M34002706	CORD,POWER BLK 6' SVT DETACHABLE, RH	1
19	M40020994		2
20	C35001567		1
21	5182K135		1
22	C35001168	PLUG, 3/8" NPT, 304 SST, CORED	1
23	M35002743		2

SHOP NOTE:
1. PASIVATE MIX BOX HOUSE BEFORE ATTACHING COMPONENTS. USE PICKLING ACID WONDER GEL

REV:	DRAWN BY/ DATE	DESCRIPTION:	CHECK BY/ DATE	APPR. BY/ DATE

UNLESS OTHERWISE SPECIFIED TOLERANCES
ANGULAR: ±1
FRACTION: ±1/16"
DECIMAL: ±0.0625"

DRAWN BY: LEB DATE: 8-19-13
CHECK BY: DATE:
APPR. BY: DATE:

SCALE: 1:8

camfil
WASHINGTON NORTH CAROLINA
www.camfilfarr.com

DRAWING TITLE:
MIXING BOX FOR POST HOT TEST DECON

SIZE	DRAWING NO.:	SHEET	OF	REV:
B	M40020989	2	2	0

Benefits:

Chlorine Dioxide Gas vs. Formaldehyde

Quicker cycles with Chlorine Dioxide (CD) Gas than Formaldehyde

1.5 to 3 hours depending on the concentration chosen vs. typically 12 hours for formaldehyde.

No carcinogenic effects with CD Gas than Formaldehyde

Unlike formaldehyde, chlorine dioxide is not carcinogenic and is used for treating food and drinking water.

CD vs VPHP

Quicker cycles with Chlorine Dioxide (CD) Gas than Vapor Phase Hydrogen Peroxide (VPHP)

1.5 to 3 hours depending on the concentration chosen vs. typically overnight for VPHP.

No cycle development required for CD Gas

CD: 1 mg/liter for 2 hours or 5 mg/liter for 30 minutes of Exposure.

VPHP: Cycle parameters must be developed for every specific size and shape HEPA Housing. If ambient temperatures change, the cycle parameters most likely need to be changed.

Better distribution with a true gas like CD Gas

CD gas is a true gas which naturally fills the space it is contained within, no matter the shape or amount of items inside the space.

VPHP is a liquid at room temperature and as such has limited natural diffusion. Too rapid flow through the HEPA filter or too low of injection rate does not get kill. Too slow a flow or too high of injection rate causes wetting of the filter. Internal corners create dead areas that prohibit vapors to flow and decontaminate these critical internal components. Variability of the filter "loading" also effects flows as well as creating too much organic matter preventing complete kill by using up the hydrogen peroxide thus lowering the concentration.

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