

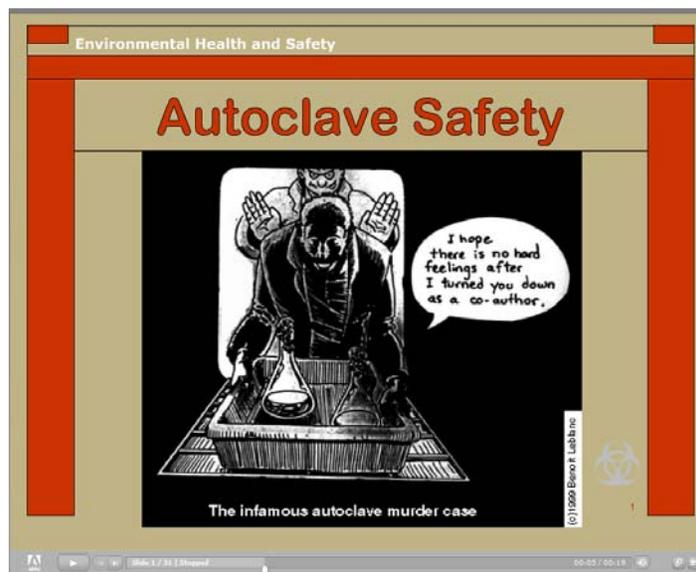
BMT STERIVAP 446 Autoclave Operating Instructions

02/06/2012 S.V.

Location: 1211 Hach Hall
Contact: Steve Veysey, 1234 Hach Hall

Safety

All users of this autoclave must complete the EH&S "Autoclave Safety" course available on-line at www.ehs.iastate.edu.



The steam sterilizer may only be operated by persons who understand the dangers and hazards associated with steam sterilization and are confident that they can safely use the autoclave for the intended purpose. The EH&S course discusses sterilization uses, hazards, and correct operational procedures.

EH&S has also developed two short videos available on-line that show proper and improper ways of loading an autoclave. These are located at <http://itunesu.iastate.edu/>. You will need to log in with your ISU netID, then navigate to the EH&S library of safety videos. These movies can also be accessed from the Safety page of the CIF website, www.cif.iastate.edu/Safety.

The STERIVAP Operating Instructions Manual presents detailed information specific to the safe and efficient use of this unit. Each research group using the instrument has been provided with

a complete copy of the STERIVAP Operating Instructions Manual. This is also available in PDF format at our website, www.cif.iastate.edu/other-insts/autoclaves.

Use the EH&S course, the STERIVAP manual, and other written or internet sources to understand the correct uses of steam sterilization as they apply to your research needs. **Do not attempt to use the sterilizer until you are sure that you know what you are doing.**

Training Requirements

Before operating the sterilizer, you MUST be properly trained and authorized by CIF personnel! In addition to this operation summary, please refer to your group copy of the STERIVAP Operating Instructions Manual or to the PDF version available at our website.



All uses of the sterilizer must be recorded on the log sheets attached to the unit. If the program runs “Fault Free”, you should keep the program printout for your own records. If there is an error, report the problem to me as soon as possible. You must provide me with a copy of all printouts flagged as “Failed”, “Process Interrupted”, or “Error”. If an emergency occurs that you feel may be damaging the instrument, or presenting a potential safety hazard, you should call 4-5100 to report the problem and you must also notify Steve Veysey, 1234 Hach Hall.

Operation

The STERIVAP 446 Autoclave is a fully automated autoclave controlled via a large touch screen located on the front of the unit. When the unit is in standby mode, you may see a dark screen, or a clock face. Gently touch the screen to bring up the menu screen.

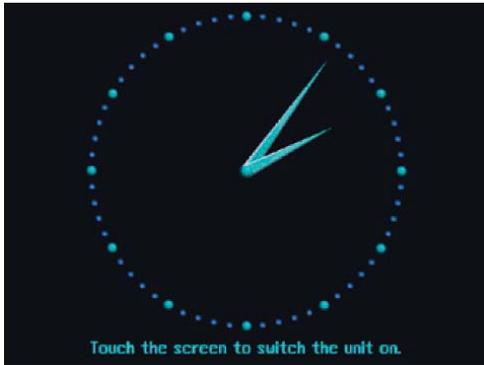


Fig. 1. "Standby Screen"

Note: The screen may be totally dark if the unit is in "sleep" mode. Just touch the screen to bring up the Menu System.

Depending upon the state of the unit when it was placed on Standby, you may be presented with one of several different screens when you enter the Menu System. Most commonly, you will be presented with the *Basic Screen*.

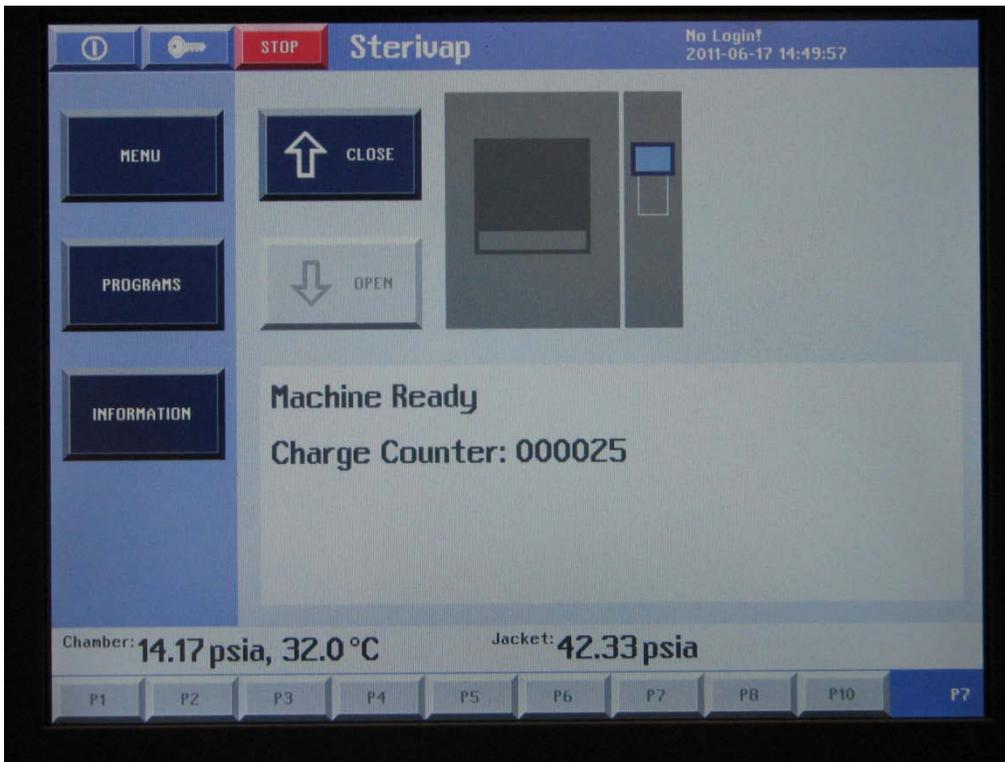


Fig. 2. "Basic Screen"

Note: You may be presented with a different screen depending upon the operational state of the unit.

Notice in the upper left corner of the screen that the user status is "No Login". You may **Open** and **Close** the door and view **Menu**, **Program**, and **Information** items, but you will not be able to actually use the sterilizer. To login, you will need to press the **Key** button . This will bring up the *Login Screen*.

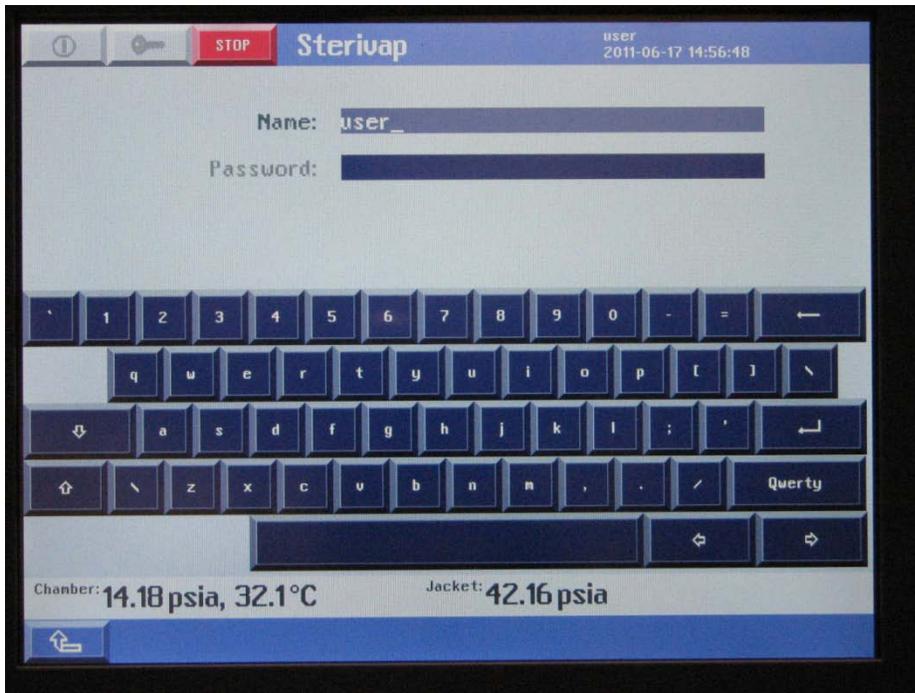


Fig. 3. "Login Screen"

The software supports ten different user profiles. For the moment, everyone should login using the "user" profile. Eventually, each research group will be assigned a profile.

Name: user Password: pbmt

After logging in, you will be returned to the screen from which you invoked the login **Key**. In this example, it is the *Basic Screen* (See Figure 2). From the Basic Screen you can access the *Menu Screen*, the *Programs Screen* and the *Information Screen*.

Feel free to discretely investigate these screens, but avoid taking actions that you do not understand. In particular, the settings in Basic -> Menu -> Printer should not be changed from the default settings:

-printer [check]; printer archive [X]; graphic [radio button on]; digital [rb off]; none [rb off]

For normal operation, you will just be using the *Programs Screen*. Note that there are twelve programs currently available, but only eight are shown on the screen. To access the others, just touch the "down" button , adjacent to the "up"  and "go-back"  buttons located along the bottom of the screen.

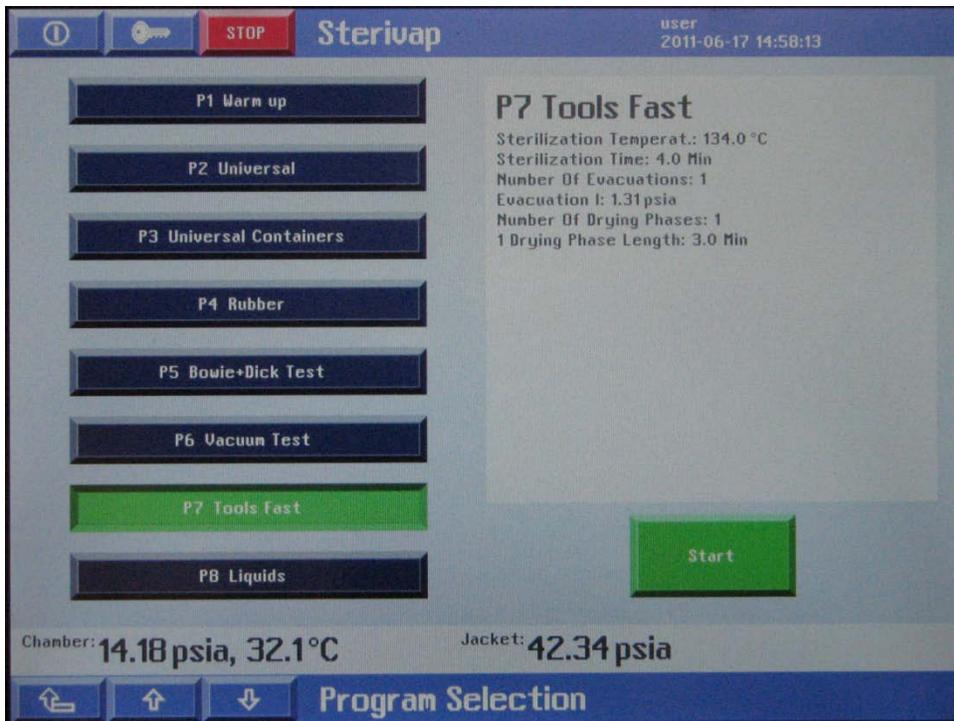


Fig. 4. “Programs Screen”

Note: Programs 1 thru 10 can also be implemented from the button bar along the bottom of the “Basic Screen”.

Each of the programs is described in detail in the full STERIVAP Manual; a copy is available for each research group. The complete manual is also available electronically in pdf form. The programs are listed in Appendix A attached to this document. Notice that programs 1 through 10 can also be initiated using the soft keys along the bottom of the *Basic Screen*.

As you try to implement programs you will soon realize that the software recognizes the state of the door and may not allow you to select or **Start** a new program. The message flashed will tell you to open or close the door as appropriate, which can only be done from the *Basic Screen*. Use the “go-back” button  to clear the message.



Fig. 5 Door Open



Fig 6. Liquids Temperature Probe

When using one of the liquids programs, be aware that the software monitors the temperature of the liquids probe, normally located in a holster inside the autoclave cavity. This probe should be placed in

the solution being sterilized. At the end of the sterilization cycle, the door will not open until the temperature of the liquids probe is below 95 °C. This can take more than an hour, and in fact may never happen if the probe is not in the liquid, but instead is left in the holder, which is part of the heated steel chamber jacket. Eventually a “Timeout Error” will occur.

Once a program has been **Started**, you should be brought to the *Program Status Screen*.



Fig 7. *Program Status Screen*

Note: The new buttons along the bottom provide alternate views of the program status.

Be aware that the “estimated time” for completion of the run is not always accurate, especially if liquids cool-down is involved.

As with all autoclaves, the STERIVAP programs consist of multiple segments, each with specific pressure, temperature, vacuum, and time requirements. If all of the segments complete successfully, the system will print out a summary page clearly indicating that the run was Fault Free. See Figure 8, below. The “*Program Done Screen*” will be displayed, and a pleasant beeper will sound (and will continue to sound...) until someone presses the OK soft key on the *Program Done Screen*.

If the program does not run successfully, the printout will indicate that the program has Failed, or has an Error. Depending upon operator actions, it may indicate that the program has been Interrupted. See Figure 9, below. An unpleasant beeper will sound (and continue to sound) until the alarm is silenced (alarm soft key), or corrective action is taken.

Sterivap 5110185

P8 Liquids, 121.0 °C (PT3.D), 20.0 Min
User: user
Start 21:16:16 2011-06-15
T(PT3.D) = 21.6 °C; p = 14.24 psia

Charge 00023

Evacuation (1)
T(PT3.D) = 21.7 °C; p = 14.32 psia; 21:16:36 2011-06-15
T(PT3.D) = 21.8 °C; p = 7.27 psia; 21:16:51 2011-06-15

Heating 21:16:57 2011-06-15
T(PT3.D) = 21.9 °C; p = 8.00 psia

Start Of Sterilization 21:29:05 2011-06-15
T(PT3.D) = 121.2 °C; p = 33.29 psia

End Of Sterilization 21:49:05 2011-06-15
T(PT3.D) = 121.7 °C; p = 31.11 psia

End 22:47:20 2011-06-15
Program Length = 01:31:04

Faultfree

User: user
Signature:

Fig. 8 Printout of a Successful Run

Charge 00014

Error

Phase Too Long Jackets Filling
17:49:33 2011-06-07

Phase: 003 = Jackets Filling
PE1.1 = 14.17 psia
PE1.2 = 14.16 psia
PE2 = 14.25 psia
PE20 = 14.00 psia
PT1.1 = 24.0 °C
PT1.2 = 23.9 °C
PT2 = 23.9 °C
PT3.1 = 23.5 °C
Y50=Opened
Y30=Closed Y01=Closed UY1=Halted
Y80=Closed Y09=Closed Y23=Opened
Y20=Closed M2=Halted REU2=Upwards
Y03=Opened Y103=Opened Y07=Closed
S11.1=Not Opened S12=NotActivated
Q1=Not Block B20=Pressureless S11=Closed
SW Version 115

End 17:54:08 2011-06-07
Program Length = 00:34:37

Failed

User: admin
Signature:

Fig. 9 Printout of a Failed Run

When you have finished using the autoclave, press the Key button . This will bring up the *Login Screen*. The username field will probably say "User". Press Enter without entering a password, and the screen should revert to username "Nologin". You have successfully logged out.

Appendix A. Pre-Programmed Programs

P1	Heating	Service	-program used to initially start the autoclave.
P2	Universal	Users	-sterilization of wrapped linen and instruments.
P3	Universal Containers	Users	-sterilization of linens and instruments with extended drying
P4	Rubber	Users	-sterilization of thermally sensitive goods (plastic, rubber)
P5	Bowie-Dick Test	Service	-program used to verify sterilization.
P6	Vacuum Test	Service	-program used to verify system vacuum performance.
P7	Tools Fast	Users	-sterilization with de-aeration for unpacked tools.
P8	Liquids	Users	-sterilization of solutions.
P9	Vacuum Test	Service	-repeat; can be reprogrammed
P10	Universal	Users	-repeat; can be reprogrammed
P11	121C - 15 min media	Users	-fast sterilization of media
P12	121C - 15 min media	Users	-repeat; can be reprogrammed
P13-20	Empty	Users	-available for programming

Program	Name	Sterilization temp °C	Sterilization time (min)	Number of evacs	Cooling temp °C	Number of drying phases	Drying phase length (min)
P1	Heating						
P2	Universal	134	7	4		2	2
P3	Universal Containers	134	7	4		4	3
P4	Rubber	121	20	4		2	2
P5	Bowie-Dick Test	134	3.5	4		1	4
P6	Vacuum Test						
P7	Tools Fast	134	4	1		1	3
P8	Liquids	121	20	1	95	0	0
P9	Vacuum Test						
P10	Universal	134	7	4		2	2
P11	121 C - 15 min media	121	15	4		0	0
P12	121 C - 15 min media	121	15	4		0	0
P13							
P14							
P15							
P16							
P17							
P18							
P19							
P20							

Appendix B. Interrupting Programs; Clearing Errors

Interrupting programs without good cause should be avoided. As with all autoclaves, completely aborting a run requires that each segment of the sequence be safely terminated. The program will not allow you to abort the next segment until the unit has reached a safe status in the current segment. In addition, the unit may require you to re-confirm username and password as each segment is aborted.

In other words, aborting runs “just to save time” is a bit like trying to take a shortcut through a minefield. Don’t go there if you can avoid it.

The procedure to abort a run begins by pressing the Stop button . This should bring up the “Process Interrupted Screen”. You will have just a few seconds to press either the **Confirm** or the **Don’t Interrupt** key before the system goes into error mode.



Appendix B – Fig. 1 “Process Interrupted” Screen

After pressing Confirm, you will probably be routed to the *Login Screen*. Your username will be displayed, but you must enter your password to complete verification that you actually have the right to interrupt the program.

This will allow the unit to begin aborting the current program to a safe state, but it may take several minutes to reach safe pressures and/or temperatures and/or vacuum status for the current segment. As mentioned above, you might have to repeat this process a couple of times until all segments in the program have been safely aborted.

Errors are sometimes created when operational procedures are not followed, or when there is a hardware failure. The process for clearing errors is essentially the same as for interrupting a program: Press the Stop button, Confirm the interruption, and authenticate via the login screen. If the error was caused by a hardware failure, the underlying cause needs to be fixed or you will simply get the same error when you try to rerun the program. All hardware related errors must be reported to me immediately. As mentioned in the safety section of this document, if there is potential risk to the instrument or a safety hazard is present, call the Facilities Help desk at 4-5100. This phone line is monitored after hours by DPS (Department of Public Safety).