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Saginaw County Health Department
Laboratory Director



IS THIS AUTOCLAVE WORKING?

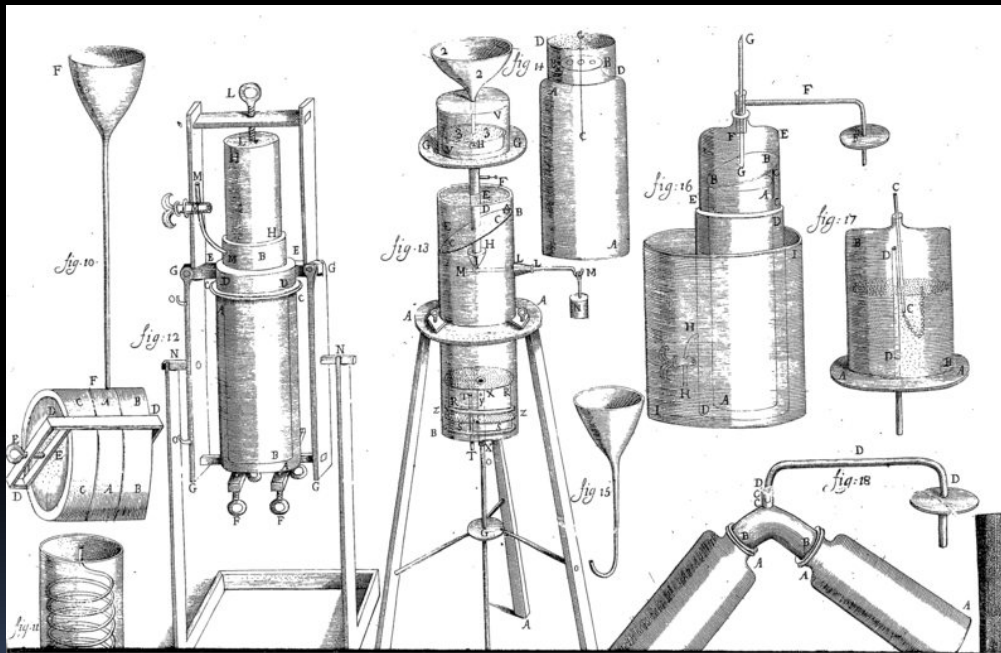


Today's Agenda

- History of steam sterilization
- Autoclave basic knowledge
- Biological Indicators
- Record keeping
- Tips
- Meeting the regulations with SCHD Mail-In Spore Program

What's an Autoclave?

Is it...
a bone digester



or



an Instapot??



History of the Autoclave



Ancient history

- 1450 B.C. Moses (or whomever) wrote in the books of Leviticus, Numbers and Deuteronomy the first sanitary code, involving the purification of materials by fire and boiling water. Later, around, 460-377 B.C., Hippocrates poured boiling water onto surgical instruments to clean them.



More recent history

- 17th Century steam pressure cooker:
 - invented in 1681 by Denis Papin (1647-1712)
 - a physicist
 - one of the inventors of the steam engine
 - Bone digester
 - It was used solely for culinary reasons
- The current design of the autoclave;
 - finalized in the 1880s by Charles Chamberland
 - building up on Denis Papin's bone digester.



Basic Autoclave Information

How it works



Autoclave basics

- Uses steam under pressure
- High pressure enables high temperature
- Steam at 100°C has almost 7 times more heat than boiling water.
- Steam must achieve constant pressure



How does it sterilize?

- Moist heat kills microorganisms
 - Coagulation of essential proteins
 - Vibratory motion in molecules destroy hydrogen bonds
- Sterilization requires time/temperature





Evolution of Pressure Cookers



Evolution of the Autoclave



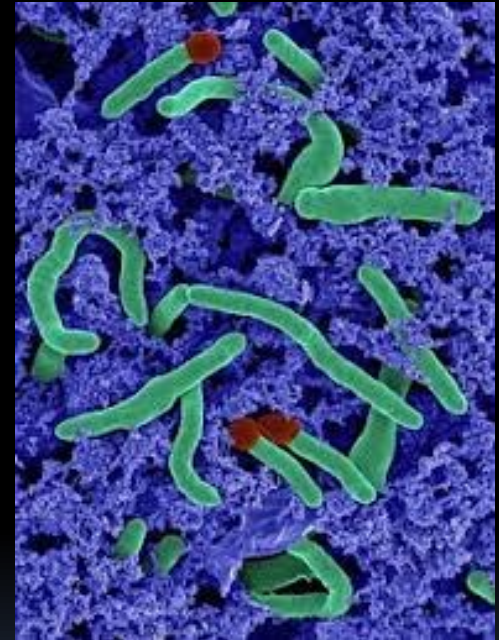
How do I know if it's working?

Biological Indicators



What is a Biological Indicator (BI)?

- Test the system
 - Viable spores that are tough to kill
 - *Geobacillus stearothermophilus* and *Bacillus atrophaeus*



Different Types of Biological Indicators



These are ampules that contain spores suspended in liquid



Spores that are attached to a paper strip. The dry strips are sent easily in the mail.



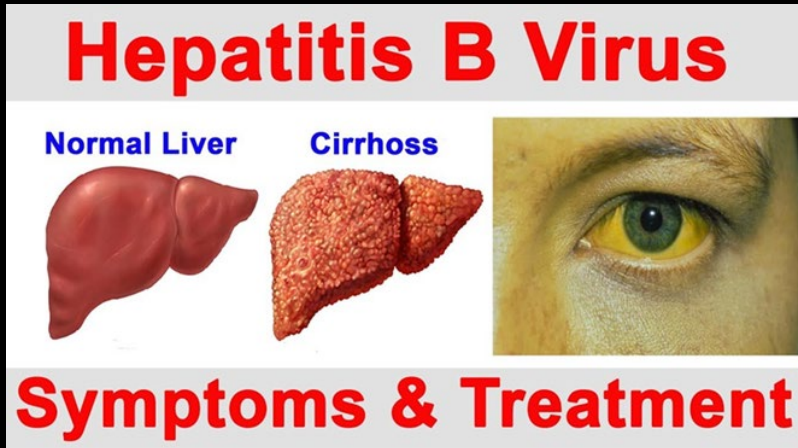
Why use Biological Indicators?

Other than it's the law...



Why use BI's

- **Oshawa tattoo shop used dirty tools (2007)**



- Health authorities suggested approximately 2,000 people to get tested for HIV, Hepatitis and
- Shop was closed until corrections were made
- Problem, a screw needed adjustments



https://www.thestar.com/news/gta/2007/08/10/oshawa_tattoo_shop_used_dirty_tools.html

<https://toronto.citynews.ca/2007/08/10/health-inspectors-issue-tattoo-warning-in-oshawa/>

Why use BI's

Tattooist banned for using dirty needles (2016)

- A tattoo artist that used dirty needles has been banned by a judge from ever working again.
- Over 800 customers were tested for HIV and hepatitis B and C.
- The tattoo artist was banned from ever working in his profession again, slapped with a \$24,000 fine and handed a 16-week suspended jail term.

- <https://www.aspokesmansaid.com/shopping/stories/content-10660/tattooist-banned-for-using-dirty-needles>





How to use the Biological Indicator's

SCHD Procedure

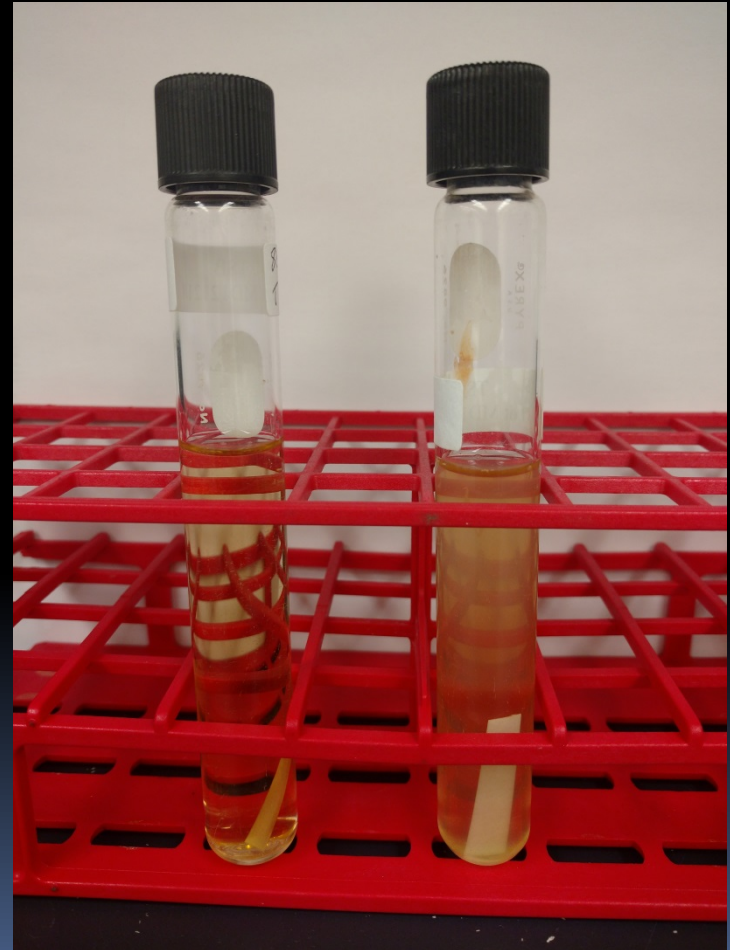




Spore Strip Process/Procedure

- Storage
- Use spore strip(s) with a full load
- Do not open the glassine packet
- Place packet in most difficult area to be sterilized (center)
- Run sterilizer following your SOP
- Document information
- Mail in spore strip

What happens at the Lab

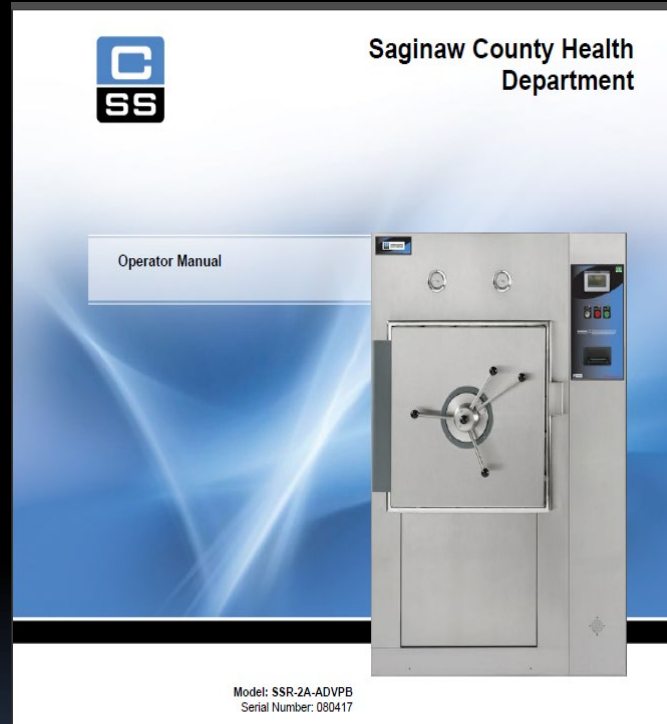


Test Report

Passed ☒

Failed ☐

Record Keeping: Manufacturer's procedures



2010 PA 375; MCL 333.13101 et seq
Section 15.1.8 of Requirements for Body Art

Record Keeping: Monthly Results:

SAGINAW COUNTY HEALTH DEPARTMENT

1600 N. MICHIGAN AVENUE, ROOM 102
SAGINAW, MI 48602-5395

Phone: (989)758-3825
Fax: (989)758-3755

PREVIEW REPORT

COPY TO:

GENERATED AT REPORT DELIVERY

Specimen Number: SA18-000013

CLIA#: 23D

Date Reported: 02/06/2019 at 12:1

1600 N. MICHIGAN AVENUE, ROOM 102
SAGINAW, MI 48602-5395

SUBMITTER: TEST BODY ART STUDIO AGENCY 1
Starlins Agency # 929594
123 TEST ROAD
SAGINAW, MI 48602

Phone: (989)758-3825
Fax: (989)758-3755

Date Collected	11/10/2018	Patient Last Name	PRECISION
Date Received	11/14/2018	Patient First Name	201
Specimen Type	SPORE STRIP		

TEST RESULTS

STERILIZATION VERIFICATION ANALYSIS

Test Strip ** GROWTH **

Interpretation: FAILED - Discontinue use immediately. Call your regulatory agency.

Control Strip GROWTH

Incubated at 55 C.

All growth checked microscopically.

PREVIEW REPORT

COPY TO:

GENERATED AT REPORT DELIVERY

Specimen Number: SA19-000001

CLIA#: 23D0374190

Date Reported: 02/06/2019 at 12:12:57PM

SUBMITTER: TEST BODY ART STUDIO AGENCY 1
Starlins Agency # 929594
123 TEST ROAD
SAGINAW, MI 48602

Date Collected	01/10/2019	Patient Last Name	PELICAN
Time Collected	11:00	Patient First Name	4B
Date Received	01/15/2019	Patient City	LANSING
Specimen Type	SPORE STRIP		
Specimen Type Detail	STEAM		

TEST RESULTS

STERILIZATION VERIFICATION ANALYSIS

Test Strip NO GROWTH

Interpretation: PASSED

Control Strip GROWTH

Incubated at 55 C.

All growth checked microscopically.

Record Keeping:

STERILIZATION LOG

Date	Items Processed (Lot # If Applicable)	Sterilization Time (Minutes)	Temp (°C)	Pressure	Cycle Start Time*	Sterilization Start Time**	Cycle End Time***	Indicator Change	Comments	Tech's Initials

15.1.6:Reactions must be recorded in a log book for each sterilization cycle



Autoclave user tips.

Things to consider if you received a failed test.



User Tips: Loading Autoclave

- Proper loading ensures the sterilization and helps to maintain operational efficiency.
- Placement of items
 - Follow manufacturer's instructions
 - Direct steam contact for complete exposure time
 - No crowding
 - Place items on their edge
 - Do not stack
 - Label items before processing



Tips: Loading Autoclave

- *Top tip: Don't over-fill or 'pack down' the load as this prevents maximum steam penetration. Spread the load evenly across the surface of the autoclave tray / shelf. If it is a mixed load with different types of products, ensure that the spread of items is even around the area of the tray / shelf.*

EXAMPLES OF AN OVERLOADED AUTOCLAVE CHAMBER (LEFT)

AND CORRECTLY FILLED 'VALIDATED' LOAD (RIGHT)



User Tips: Safety

- Hazards
- Prevention of Injuries
 - PPE
 - Inspect Autoclave
 - Item preparation
 - Item removal





Meeting the Regulations

Sterilization Verification



Saginaw County Health Dept



MAIL-IN SPORE STRIP TESTING PROGRAM FOR VERIFICATION OF STERILIZATION

*Services available for steam/autoclave, dry heat or ethylene oxide
sterilization methods*

What does SCHD Provide?

- Monthly Test Kits
 - Controls, Test Req, envelops
- Certificate of Participation
- Monthly Test Report
 - Your shop
 - ***Your local regulatory agency***
- A phone call for a failed test (within 8 hours)
- Accurate and Reliable Results within 10 days
- Support and guidance for trouble shooting



More Information on Program

- Call or Visit the Saginaw County Health Department, Laboratory
 - 1600 N Michigan Ave, Saginaw, MI 48602
 - Laboratory 989.758.3825
- Visit our website
 - <http://www.saginawpublichealth.org/page.asp?ID=443&pID=107>

Any Questions?



www.smalldogplace.com

Tammy's Contact Information



Saginaw County
HEALTH DEPARTMENT

Caring experts, advocates & champions.
For health. For everyone.

Tammy Theisen, Laboratory Director
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References/Links

- <https://www.atlasobscura.com/articles/who-invented-the-instant-pot>
- <https://www.drs.illinois.edu/SafetyLibrary/AutoclaveSafetyAndOperation>
- https://www.michigan.gov/documents/mdch/BAREqs811_360378_7.pdf
- <https://www.rdhmag.com/articles/print/volume-18/issue-7/columns/infection-control/correct-loading-and-unloading-of-a-sterilizer-vital-for-sterilization-sterility-maintenance.html>
- <http://www.saginawpublichealth.org/page.asp?ID=443&pID=107>
- <http://www.vliz.be/docs/Zeecijfers/autoclaveoperation.pdf>