

EDUCATION

STERIS UNIVERSITY



**Automated Cleaning:  
Achieving Positive  
Outcomes**

One Integrated Approach to Healthcare

STERIS

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## Objectives

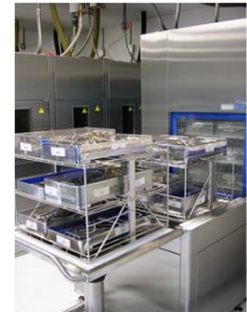
Upon completion of this course, you will be able to:

- Define the importance of cleaning as it relates to the disinfection/sterilization process.
- Review methods of Automated Cleaning
- Discuss the factors and parameters necessary to achieve a quality control system in Automated washers

## Defining the Cleaning Process

“The removal, usually with **detergent and water**, of adherent visible soil,... from the surfaces,... and lumens of instruments,... equipment by a manual or Automated process that prepares the items for safe handling and/or further decontamination.”

Association for the Advancement of Medical Instrumentation (AAMI)



## Cleaning – A Quick Review

- Achieve effective cleaning
  - Removal of gross soil
  - Pre-treatment at point of use
  - Appropriate cleaning methods
- Factors influencing cleaning
  - Type of cleaning
  - Type of cleaning chemistries
  - Time
  - Temperature
  - Water quality



## The Cleaning Process

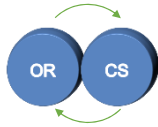
- Defining the endpoint
  - Visual cleanliness
- Trend away from manual cleaning
- Improved Technologies
  - Water/energy consumption
  - Short cycle times
  - Cycle definition/validation
  - Water filtration
  - Process assurance






## Common Challenges

**OR Procedures**

- AORN and AAMI state “Decontam begins in the OR”
- Gross bioburden removed?
- Lumens flushed?
- Enzymatic or Transport Gel applied?
- Moved to decontam without delay?



## Process Challenges








## Common Challenges – Poor Set Processing





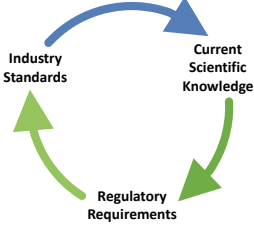
## Challenges of Cleaning

- Type of microorganisms present
- Bioburden load
- Water quality
- Complex medical devices
  - Difficult to disassemble
  - Instructions complicated
  - Accessibility to intricate parts

## Supporting Environment

- Skills competencies
- Sustain environment for repeatable results



## Instructions For Use (IFUs)

- Preparation
- Cleaning
- Inspection & assembly
- Packaging
- Sterilization method
- Storage
- DRIVER = 38 minutes!

**Instruments With Special Cleaning Instructions**

*Note: Review and properly observe the single-use sterile options before cleaning instruments.*

**983-799 APT Driver**

- Remove the APT Egg Handle, the tractor, and the lid of the APT Driver. Clean the APT Driver after each use according to the following instructions:
  - Place the APT Driver under running tap water to remove visible soil. Activate the APT Driver and scrub with a soft-bristled brush. During the rinse, dispense an enzymatic-neutral pH detergent (such as Enzymatic Neutral Detergent) on the per the detergent manufacturer's recommendations and immerse the Driver in the detergent solution.
  - Activate the APT Driver and scrub with a soft-bristled brush to remove all visible soil from the detergent solution and allow to soak for 20 minutes.
  - Rinse the APT Driver with deionized (DI) water for one (1) minute. Activate and Flush the Driver during the rinse.
  - Prepare a fresh enzymatic detergent solution per the detergent manufacturer's recommendations and immerse the Driver in the detergent solution and scrub for 15 minutes. Activate and Flush the Driver during the rinse.
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## Where Do Cleaning Failures Come From?



## Residual Soil

- Incorrect cleaning chemistry
- Complex device design
- Causes damage to instrument surfaces
  - Loss of passive layer can harbor bacteria
- Reduces effectiveness of HLD or sterilization
- Device "not safe to handle"
- Fosters biofilm formation



## Residual Soil, continued

- Procedure error
  - Follow manufacturers' IFU's
  - Review procedures against IFU instructions
  - Establish checklists
- Human Error
  - Improper cleaning techniques
    - Insufficient pre-treatment or soaking
    - Improper use of brushes
  - Overloading washer baskets
  - Improper connection to fluid flow ports

## Residual Soil, continued

- Equipment Failure
  - Washer/Ultrasonic cleaner failure
  - Failure to maintain temperature
  - Failure to dispense cleaning chemistry
  - Failure to dispense rinse water
  - Inconsistent spray pattern
  - Blocked fluid port(s)
  - Blocked drain screen



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## Methods of Automated Cleaning

- Ultrasonic cleaners
- Washer-disinfectors, washer-decontaminators
- Cart and utensil washers
- Automated Endoscope Reprocessors (AERs)



## Benefits of Automated Cleaning

- Reduce manual labor
- Increase efficiency and productivity
- Provide devices that are safe to handle
- Limit exposure to biohazards
- **ONLY IF:**
  - Properly used
  - Properly loaded
  - Properly maintained
  - Serviced in compliance with manufacturer's recommendations

## Ultrasonic Cleaning



## Ultrasonic Cleaning, continued

### Cavitation

- Energy is introduced into solution
- Bubbles create alternating positive and negative pressure waves in water
- Imploding bubbles free and lift contaminants from surfaces



## Benefits of Ultrasonic Cleaning

- Superior to manual cleaning
- Remove gross debris first
- Thorough cleaning in hard-to-reach areas
- Lifts grease, fats, lipids, proteins
- Used for fine cleaning
  - Ophthalmic or cardiovascular
  - Ortho grinder, cutters and reamers



## Ultrasonic Cleaning

- Bath temperature between 100° – 140° F
- De-gas after filling
- Submerge instruments completely in solution
- Completely fill lumens with fluid
- No mixed metals
- **DO NOT OVERLOAD OR STACK!**
- Rinse adequately



## Ultrasonic Cleaning, continued

### Enzyme/detergents

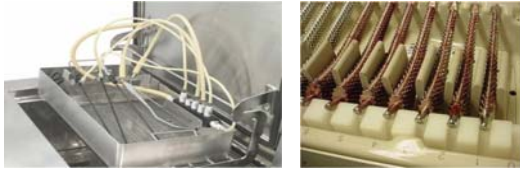
- Non-Foaming
- Decrease surface tension to maximize cavitation
- Chelating agents

### Debris in cleaning solution affects cavitation



## Ultrasonic Cleaning Device Placement

- Mesh trays
- OEM ultrasonic suitable trays
- Lumen connection ports



## Automated Washers



## Automated Washer Disinfectors

### Thermal Disinfection

- Low or intermediate level of disinfection
  - Low and high impingement Automated washers
  - Cart and utensil washers
- Heated final rinse water
  - Time is dependent on rinse water temperature
- Demonstrate effectiveness of disinfection step
  - Lethal agent delivered to medical device
- Instrumentation “safe to handle”

## U.S. vs. European Disinfections Standards

- FDA requires proof of log reduction
  - Classifies washers, washer/disinfectors as Class II devices
  - Includes cleaning, decontamination/disinfection, drying
  - LLD, ILD, HLD
- ISO 15883 requires thermal mapping
  - Specific Ao value met
    - Ao = 60 for cart washers and bed pan washers
    - Ao = 600 for surgical devices (sterilization)
    - Ao = 3000 for semi-critical devices (higher level of assurance desired)

## Loading Automated Washers

- Remove gross soil prior to loading
- Select correct manifold rack
- Use mesh trays, baskets
- Open, disassemble all instruments
- Utilize stringers
- Avoid shadowing
- Position for drainage/drying

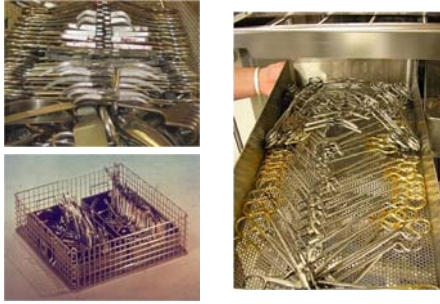


## Loading Automated Washers

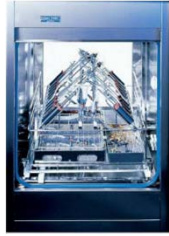
- Separate multiple tier sets
- No overloading
- Rubber mats?
- Use cart washer for utensils and containers
- Select Correct Cycle!
  - Instruments, utensils
  - Create new cycles



### Open, Disassemble Instruments



### Device Placement

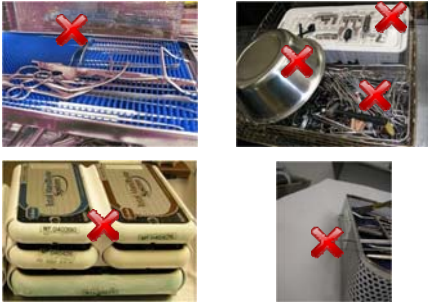


Lumen  
Connection  
Ports

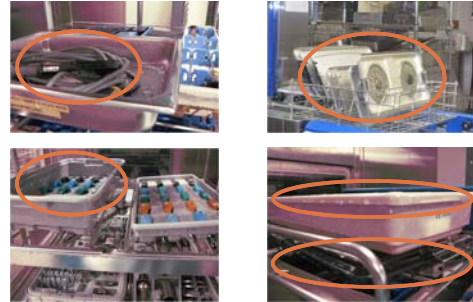


Mesh Trays, Racks, Holders

### Device Placement – Incorrect



### Device Placement – Incorrect, continued



### Device Placement – Incorrect, continued



### Device Placement – Cycle



## Hazards of Improper Loading/Residual Soil

- Instruments not “safe to handle”
- Create unsafe working conditions
- Cause instrument/equipment damage
- Cause serious injury



## Automated Washer Cycles

- Pre-wash
- Pulsed enzyme
- Wash
- Neutralizer
- Rinse
- Thermal rinse
  - Renders “safe for handling”
- Dry



## Automated Washer Verification

The process is working

- The instruments are visually clean (are some soils “hidden”?)
- The instruments are disinfected
- The instruments are functional
- The washer is working properly



Validation = Is the process capable and reproducible?

## Compatibility



## Cart and Utensil Washers

- Process large volumes
  - Reusable stainless steel, plastic, aluminum
  - Case carts, containers, patient care utensils
- Automated cleaning
  - Reduces microbial contamination
  - Provides low level disinfection
  - Items safe to handle



## Cart and Utensil Washers

- Safety features
- Automated features
  - Load/unload modules
  - Moving spray arms
  - Automatic floor tilts
  - Glass windows
- Water quality
- Cleaning chemistries
  - Materials compatibility



## Cart and Utensil Washers



*Manifold cart for  
utensils/containers*



*Load/unload floor  
mounts  
Adequate space for  
movement in and out*

## Cart and Utensil Washers, continued

- Cycle selections
  - Beds, carts, containers, utensils, aluminum-safe
- Cycle parameters
  - Pre-wash
  - Wash
  - Rinse
  - Vapor removal
  - Drying
- Decontaminate weekly

