

CLEANING AND DISINFECTION OF OPHTHALMIC INSTRUMENTS

MARILOU L. MORTEL, MBA, RMT, SPT, DGSV, SGSV

**Unit Manager,
Central Sterilization Unit**



MAKATI MEDICAL CENTER PHILIPPINES



OBJECTIVES:

1. To discuss about the standard of cleaning process
2. To understand the disinfection AO concept
4. To differentiate types of Ophthalmic Instruments
5. To show different types of surface passivation
6. To know the water and it's influence on Instruments reprocessing

CLEANING PROCESS

TYPES OF CLEANING PROCESS



Reason why

- Only automated processes can be adequately **validated**
- Better cleaning **results**
- More **reproducible** and reliable results
- Easier **control**
- Reduced **exposure**
- **Safer** & more convenient
- **Reduced** chemical use
- **Faster** & safer for patients

MANUAL & MECHANICAL

Different Types of Ophthalmic Instruments



ULTRASONIC

Ultrasonic cleaning uses cavitation bubbles induced by high frequency pressure (sound) waves to agitate a liquid. The agitation produces high forces **40/135KHz** on contaminants adhering to substrates like metals, plastics, glass, rubber, and ceramics. This action also penetrates blind holes, cracks, and recesses.

DECONTAMINATION AREA

Spital Limmattal

Gebäude	02 Orientierung Pflegezentrum
Geschoss	Pflegezentrum
05	Pflegestation Zimmer 501 – 517
04	Pflegestation Zimmer 401 – 417
04	Sozialdienst Pflegezentrum
03	Pflegestation Zimmer 301 – 317
02	Pflegestation Zimmer 201 – 217
01	Pflegestation Zimmer 101 – 115
01	Leitung Pflege+Betriebswirtschaft Pflegezentrum Astrid Hunter
01	Leitende Ärztin Geriatrie und Medizin Dr. med. Marion Baumann
01	Urologische Sprechstunde Dr. med. Hartmut Knönagel
	Akutspital
E	Haupteingang Auskunft, Empfang
E	Bühnen- und Gartensaal
E	Coiffeur und Fusspflege
E	Café Santé
U1	Tageszentrum
U1	Ergotherapie, Logopädie, Physiotherapie
U1	Musiktherapie, Aktivierungstherapie
U1	Bibliothek
U1	Orthopädische Klinik (Gebäude 03) Dr. med. Thomas Hug / Dr. med. Igor Killier Dr. med. Oliver Ziegler
U1	Personalabteilung (Spitalstrasse 31)



Robert-Koch Institute suggests an **Ao**
value of 3000 is required for reprocessing
instruments.

THERMAL DISINFECTION

A_0 CONCEPT

EN ISO 15883 – is the international standard for cleaning and disinfection of devices

A_0 - is defined as disinfection effect of a procedure

$A_0 = 600$

- ❖ corresponds to 10 mins at 80 degC, this is sufficient to kill vegetative bacteria, fungal spores and thermally unstable viruses.

$A = 3000$ (5 mins at 90 degree Celsius or 50 mins at 80 degree Celsius)

- ❖ Deactivates Hepatitis B Viruses

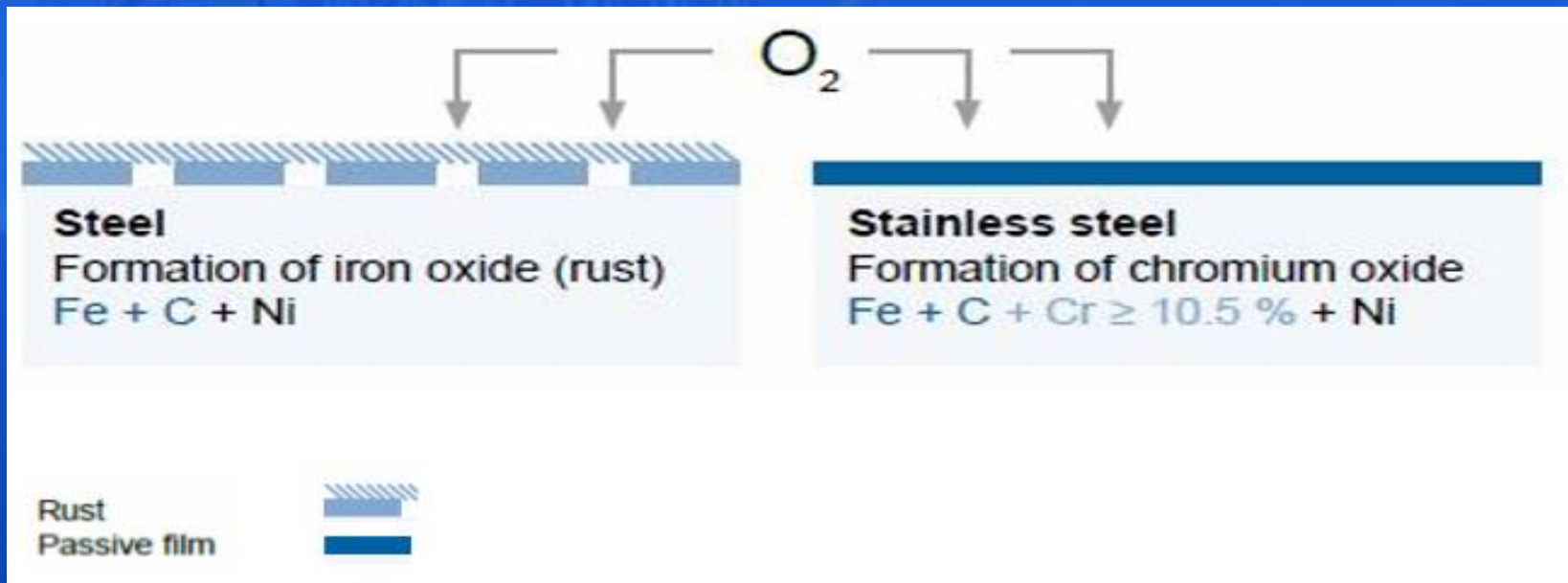
FACTORS TO CONSIDER IN STERILIZATION PROCESS

- ❖ Cleaning process
- ❖ The process for surface passivation
- ❖ Passivation
- ❖ Water and it's importance in reprocessing

THE PROCESS FOR SURFACE PASSIVATION

THE PROCESS FOR SURFACE PASSIVATION

PASSIVATION - A material becoming “PASSIVE” →
Iron (Fe) compounds cleaned away and Chromium (Cr)
oxide layer increased



WHY SURFACE PASSIVATION?

Conservation of value

- ❖ Even stainless steels of highest quality may rust
- ❖ Protection of surfaces against chemical attack
- ❖ Demand of the market
- ❖ Applications for pharmaceutical equipment production, medical instruments and medical devices

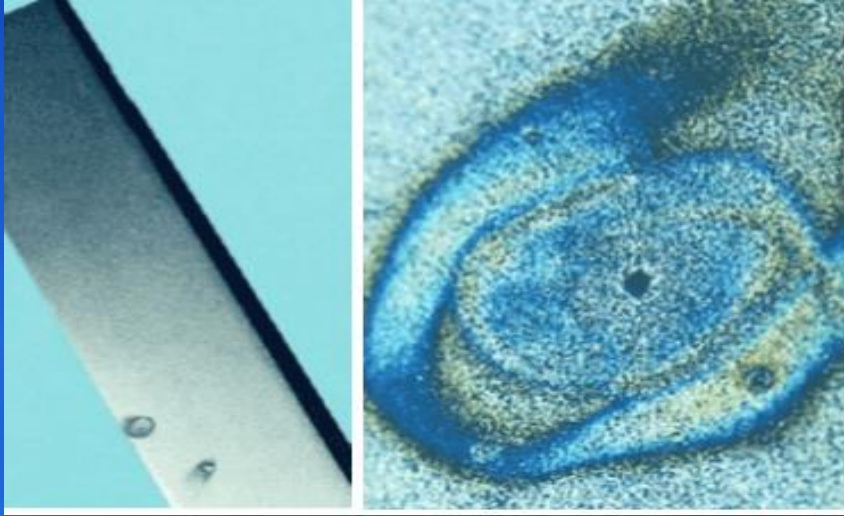
GOALS OF PASSIVATION

Protection of Stainless Steel Surfaces

- ❖ Critical Places : welding seams
- ❖ Formation of an intact passivation layer
- ❖ Building of a protective barrier against ions and molecules inducing corrosion

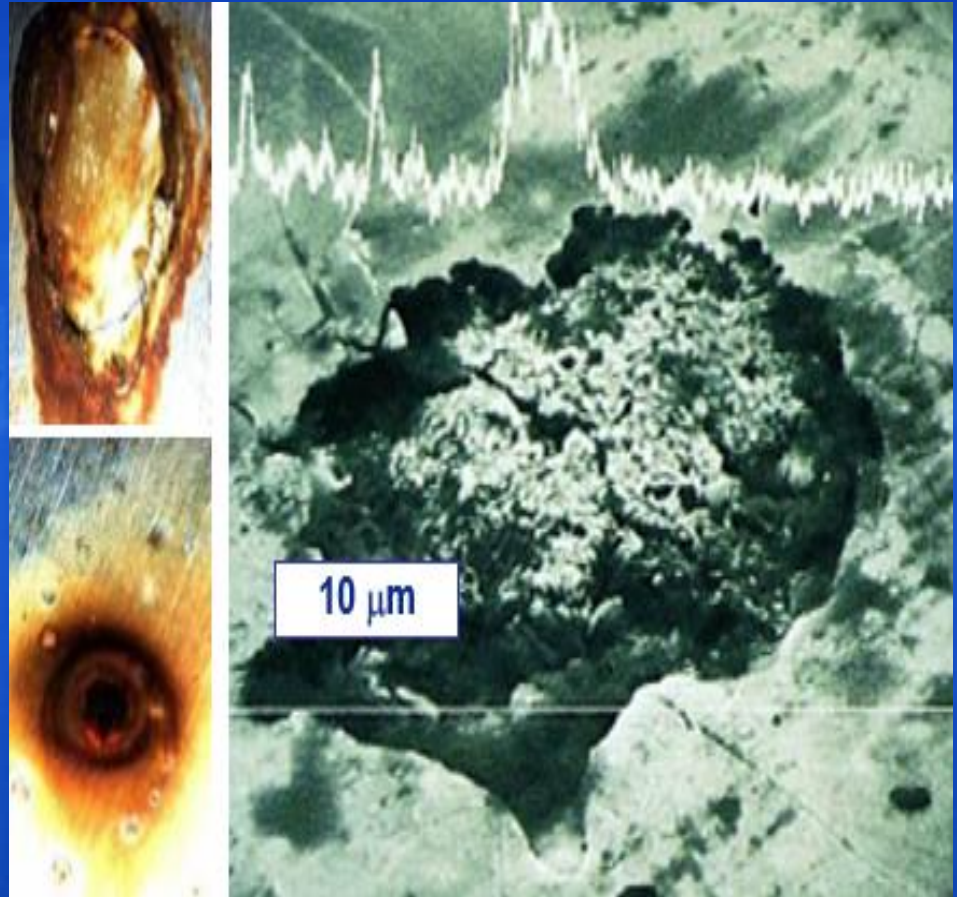
CORROSION

Typical Corrosion Phenomena



Corrosion induced or promoted by:

- Cl residues from detergents, culture medium, water
- Cleaning process is optimal
- Insufficient surface passivation



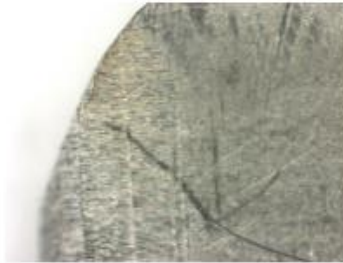
RESISTANCE AGAINST CORROSION

Inspection of surfaces soaked in sea-water

without passivation

surface passivated

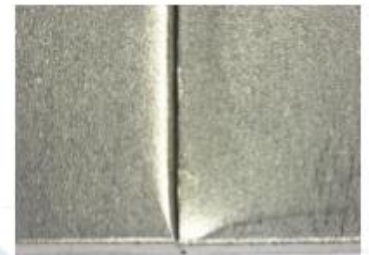
cutting edge



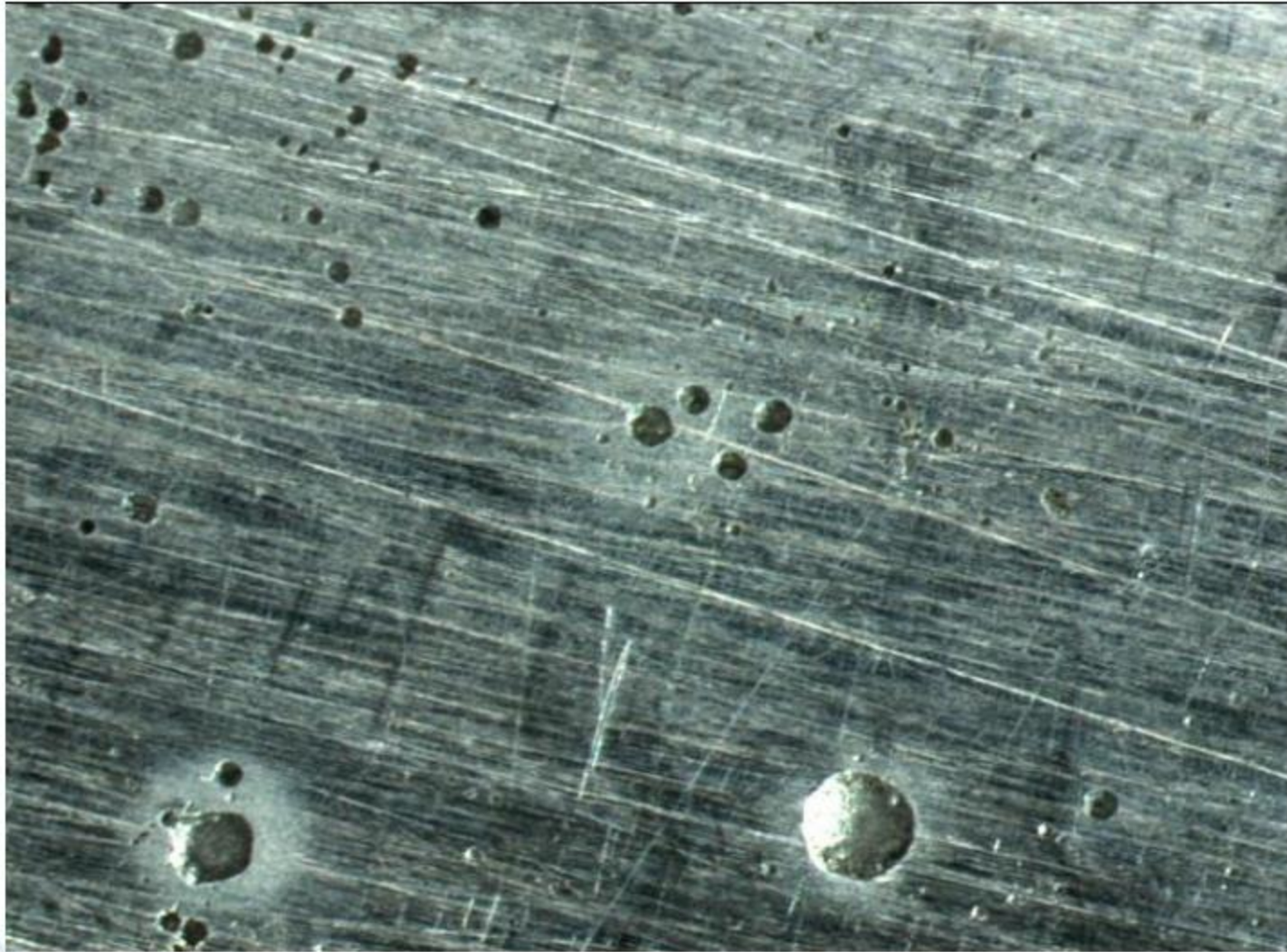
polished side,
welding seam



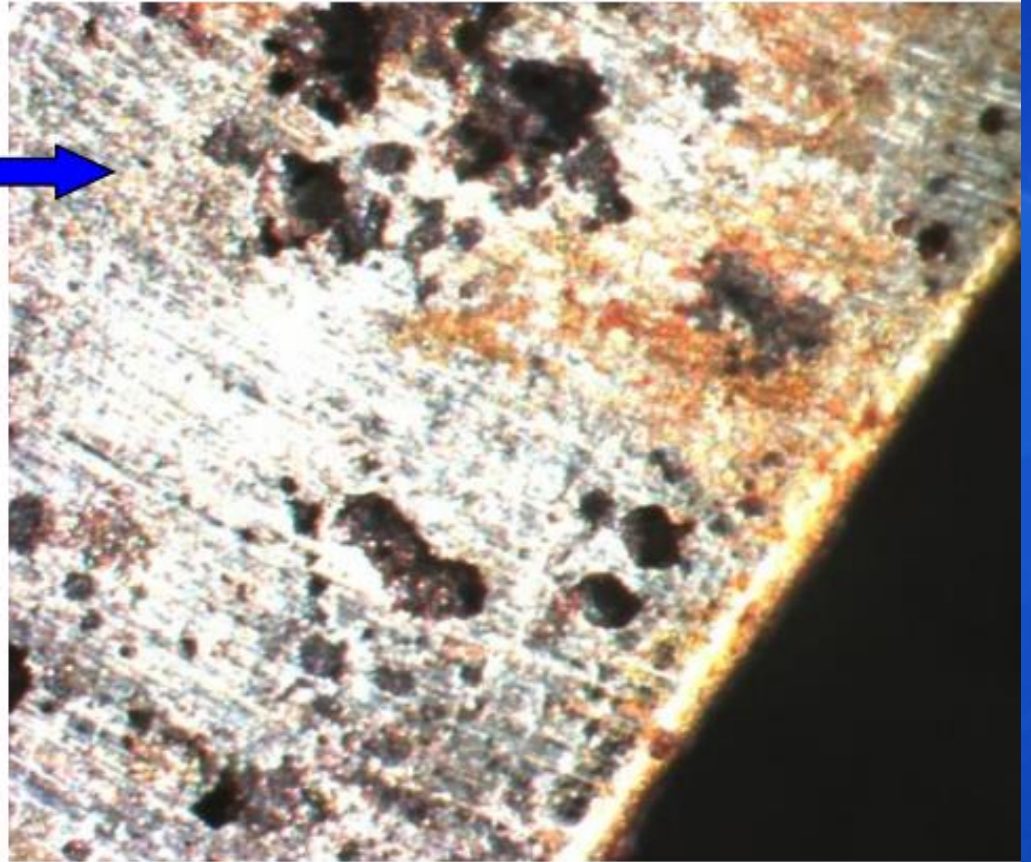
back side,
welding seam



CORROSION CAUSED BY CHLORIDE



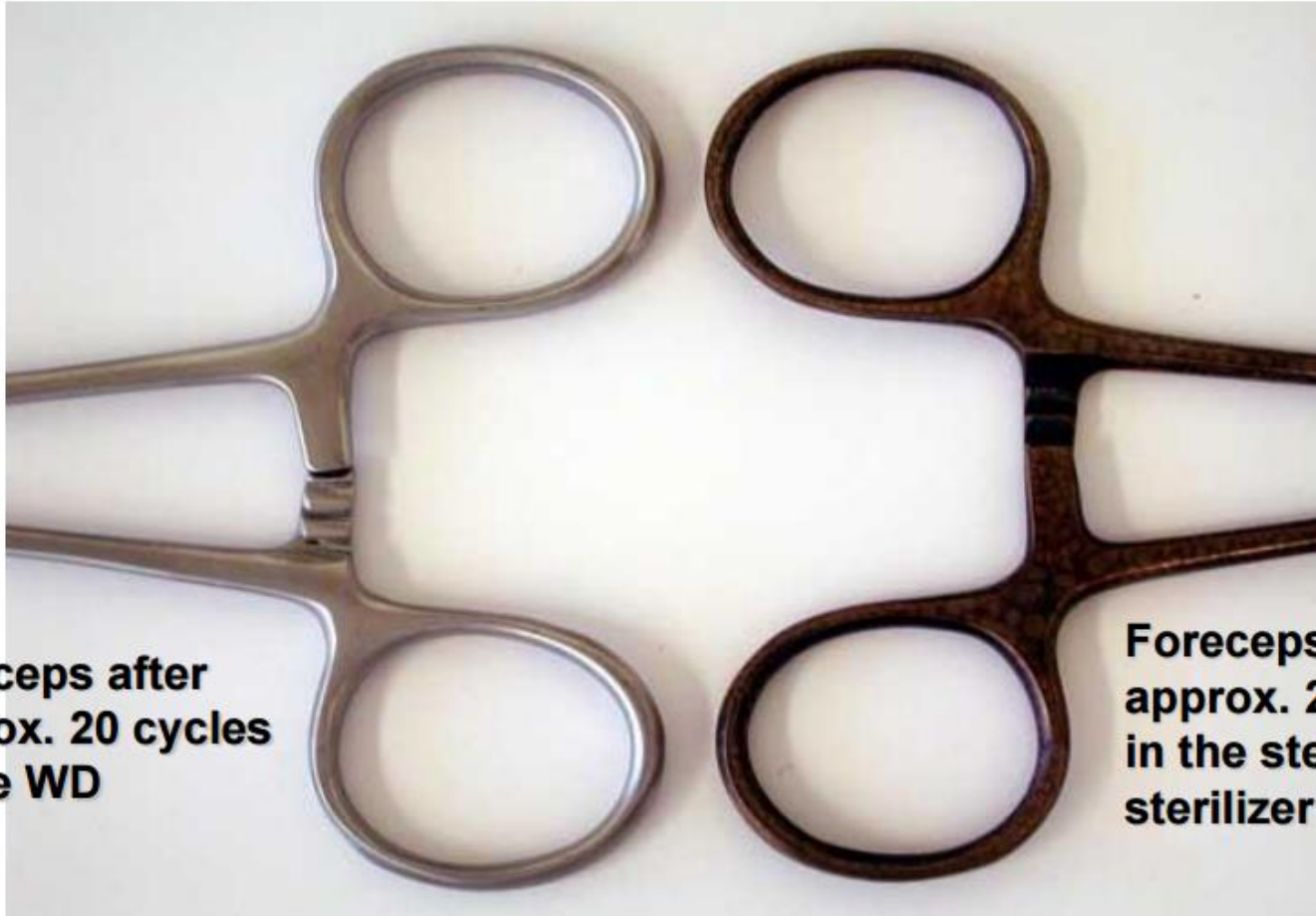
BADBLY TREATED PITTING AND RUST CORROSIONS



WATER MARKS



RUST DISCOLORATION



**Forceps after
approx. 20 cycles
in the WD**

**Forceps after
approx. 20 cycles
in the steam
sterilizer**

SILICATES CAUSES DISCOLORATION ON INSTRUMENTS



IMPORTANT TO KNOW

- ❖ The new process considerably increases the passivation layer
- ❖ Preparation – alkaline cleaning before passivation step
- ❖ Concentration of Alkaline cleaner
- ❖ Contact times, temperature
- ❖ Validated analytical method

WATER AND ITS IMPORTANCE IN REPROCESSING

WATER & IT'S INFLUENCE ON INSTRUMENTS REPROCESSING

Water fulfills a variety of functions in the treatment process, including:

- Dissolution of detergents and other treatment agents
- Transfer of treatment agents to the surface of the items to be reprocessed
- Transmission of mechanical forces
- Transfer of heat to the surface of the items to be washed
- Dissolution of soluble dirt, contaminants and impurities
- Flushing away of dirt, cleaning and treatment solutions
- Thermal disinfection in automated processing
- Generation of steam for steam sterilization



WATER AND IT'S NATURAL CONTAMINANTS

Minerals

- Calcium
- Magnesium
- Iron
- Sulphates
- Chlorides
- Silica

Organics

- Humic acid
- Tannin
- Pyrogens

Solids organic

- Algae
- Fungi
- Bacteria
- Viruses

Solids inorganic

- Silt
- Rust
- Floc
- Clays



MOST COMMON COMPLICATIONS OF EYE SURGERY

TASS - Toxic Anterior Segment Syndrome

TASS is a sterile, non-infectious acute postoperative anterior segment inflammation that is **caused** by a non-infectious substance that enters the anterior segment, resulting in toxic damage to intraocular tissues.



With **TASS**, patients complain of blurred vision, mild ocular pain and eye redness following cataract surgery.

MOST COMMON COMPLICATIONS OF EYE SURGERY

Endophthalmitis is a purulent inflammation of the intraocular fluids (vitreous and aqueous) usually due to infection. Serious intraocular inflammatory disorder resulting from infection of the vitreous cavity. Progressive vitritis is the hallmark of any form of **endophthalmitis**.



REFERENCES:

- Robert Kock Institute
- AAMI 2017
- Guidelines for the Cleaning and Sterilization of Intraocular Surgical Instruments 2018 –American Academy of Ophthalmology

Thank you!