

NANO-INDIS

**NANO-STERILIZATION
INDICATORS**

(AGENT & PRCESS SELECTIVE)

MAKING/TESTING OF SELECTIVE STERILIZATION INDICATORS

- A metallized plastic film was coated with an activator/precursor
- The coated film was cut into small strips
- The strips were treated under different test/sterilization conditions
- The treated strips were mounted on a red paper
- If the metal is etched, the strip became clear and hence the red color of the paper is visible

**STERILIZATION
INDICATOR
SELECTIVE TO
STEAM ONLY**

Nano steam sterilization indicator selective to steam



- ← Red paper
1. Control (white coating on metal)
 2. Saturated/100% humidity, 55°C for 3 days (transparent coating, metal visible)
 3. Steam 100°C for 30 minutes (slight etching of metal layer)
 4. Steam 120°C, 30 minutes (metal layer completely etched)
 5. Steam 120°C, 60 minutes (metal layer completely etched)
 6. ETO gas ~50% humidity, 35°C, 3 hrs
 7. H₂O₂ vapor, 50°C, 3 hrs

**STERILIZATION
INDICATOR
SELECTIVE TO
ETHYLENE OXIDE
ONLY**

Nano-ETO sterilization indicator, selective to ETO



← Red paper

1. Control, (white coating on metal)
2. Saturated/100% humidity, 55°C for 3 days (transparent coating, metal visible)
3. Steam 100°C for 30 minutes
4. Steam 120°C, 30 minutes
5. Steam 120°C, 60 minutes
6. ETO gas ~50% humidity, 35°C, 3 hrs (metal layer completely etched)
7. H₂O₂ vapor, 50°C, 3 hrs

**STERILIZATION
INDICATOR
SELECTIVE TO
ETO & HYDROGEN
PEROXIDE ONLY**

ETO & hydrogen peroxide (H₂O₂) Sterilization Indicator

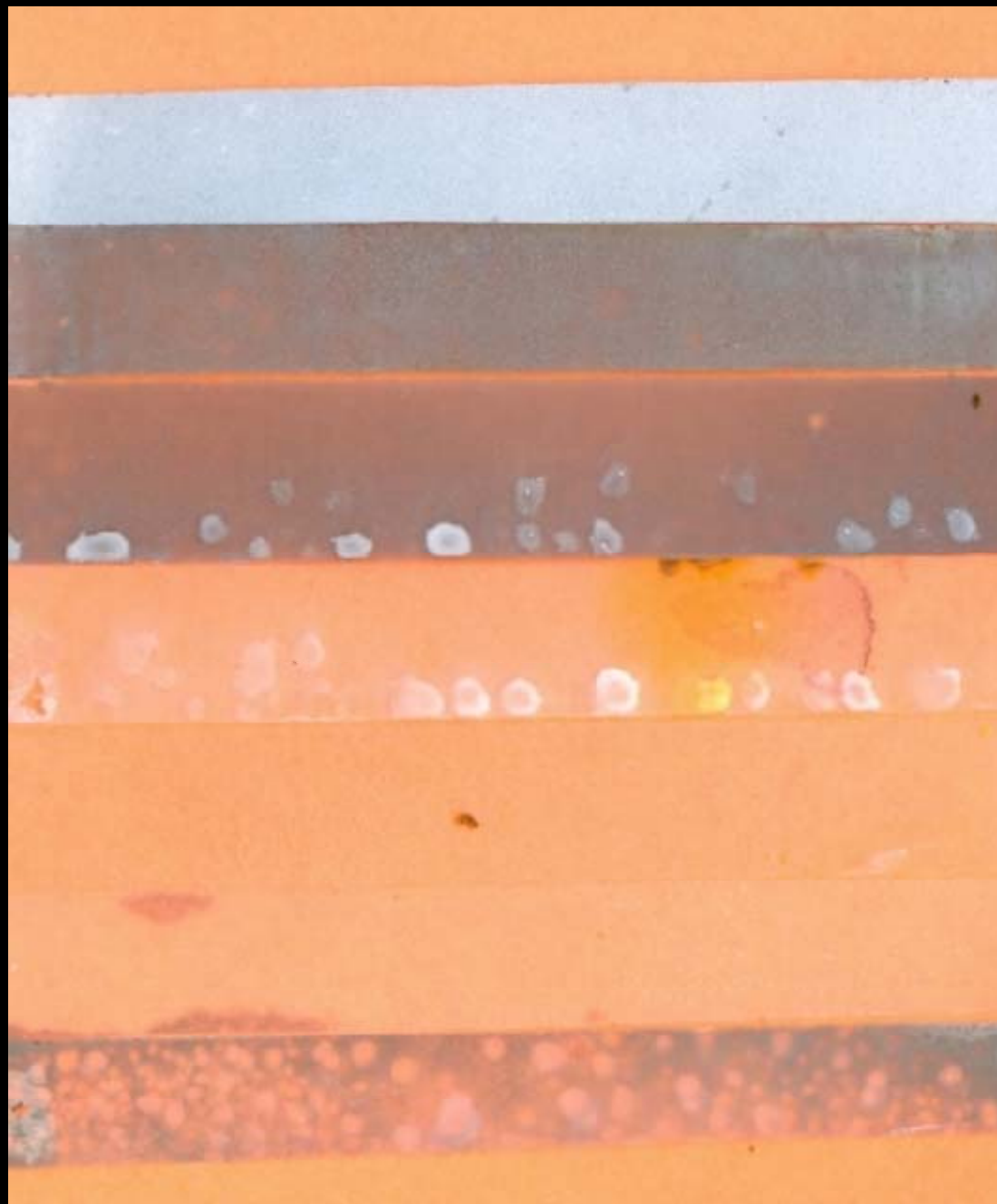
← Red paper



1. Control, (white coating on metal)
2. Saturated/100% humidity, 55°C for 3 days, (transparent coating, metal visible)
3. Steam 100°C for 30 minutes
4. Steam 120°C, 30 minutes
5. Steam 120°C, 60 minutes
6. ETO gas ~50% humidity, 35°C, 3 hrs (metal layer completely etched)
7. H₂O₂ vapor, 50°C, 3 hrs (metal completely etched)

**STERILIZATION
INDICATOR FOR
MANY STERILANTS
(PASS THROUGH)**

Nano pass-through sterilization indicator for all sterilants



← Red paper

1. Control

2. Saturated/100% humidity,
55°C for 3 days

3. Steam 100°C for 30 minutes

4. Steam 120°C, 30 minutes

5. Steam 120°C, 60 minutes

6. ETO gas ~50% humidity,
35°C, 3 hrs

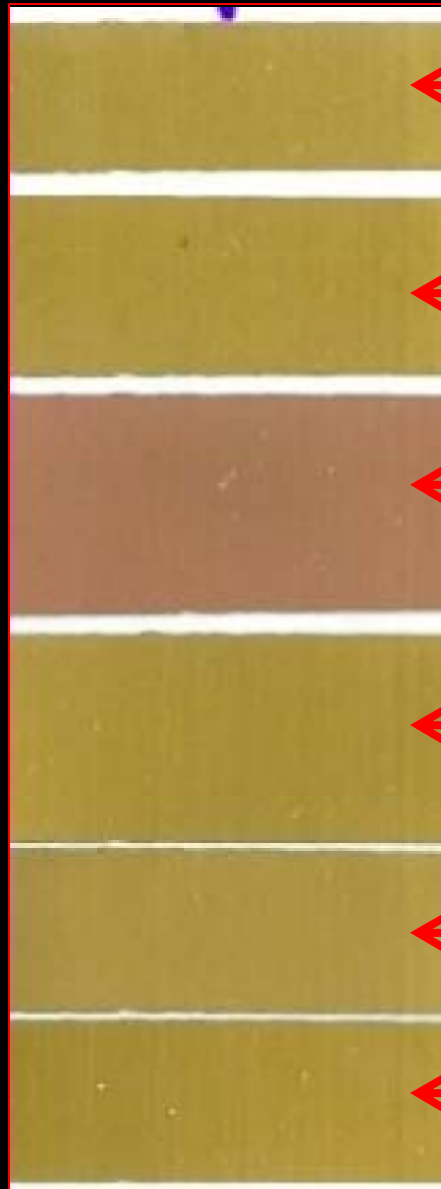
7. H₂O₂ vapor, 50°C, 3 hrs

STERILIZATION INDICATOR

**SELECTIVE TO DRY HEAT
ONLY**

(SELECTIVE DESTRUCTION)

SELECTIVE ETCHING OF ZINC FROM AN ALLOY (BRASS) COATED WITH A PRECURSOR



Control

Dry heat 120°C, 30 minutes

Dry heat 160°C, 30 minutes (selective etching of zinc)

Steam 100°C, 30 minutes

Steam 120°C, 30 minutes

100% humidity, 60°C, 2 Days

NANO STERILIZATION INDICATORS



(Metallized plastic film
with an activator coating)

↓
Steam, EtO, Plasma,
Radiation or dry heat



- Depending upon the activator used, the device can be made to undergo the same change with one or more of steam, ethylene oxide, hydrogen peroxide, formaldehyde or high energy radiation treatment
- **It makes no difference which process for sterilization is used, the initial color (silvery /opaque) and the final color (green) with a message (STERILIZED) will be the same**

NANO-INDIS™

**A REVOLUTION IN
INDICATOR TECHNOLOGY**

**SUPER SELECTIVE
INDICATOR TECHNOLOGY**

NANO-CONVERSION TECHNOLOGY

AN IGNORED BUT NOVEL AND
UNIQUE FIELD OF NANOSCIENCE

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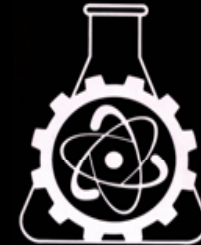
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