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CLEAN & ULTRACLEAN

Clean & Ultraclean

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WHY CLEAN AND ULTRACLEAN?

- Awareness of nutritional values and health has increased, whereas clean and ultraclean filling preserves the physical and chemical properties of your products.
- Extended products' shelf life with chilled cabinet storage.
- Customization of every project to get the best solution for you

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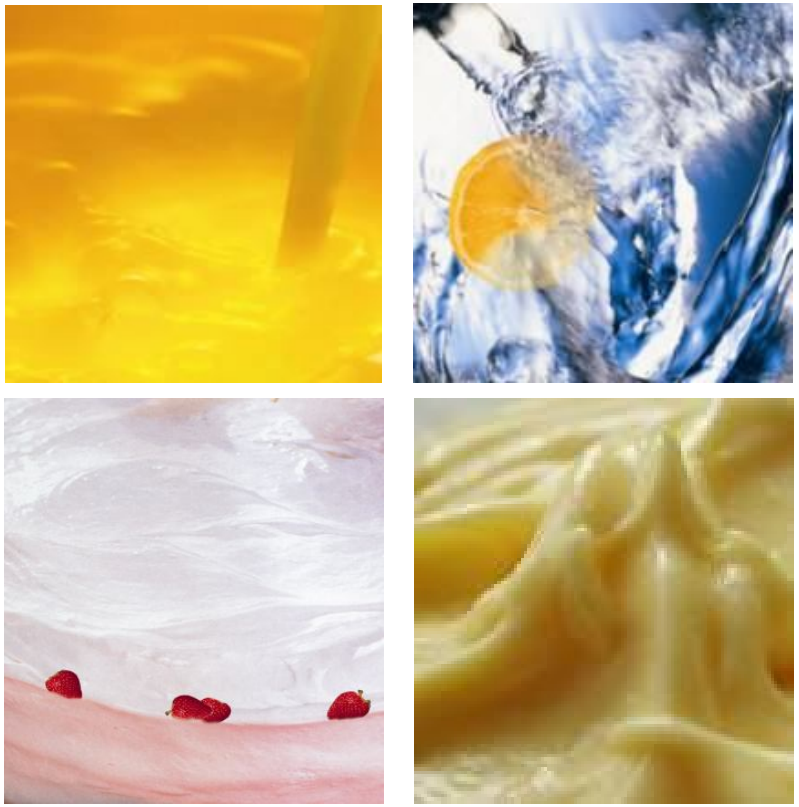
CLEAN & ULTRACLEAN APPLICATIONS

- Yoghurt
- Ice cream
- Smoothies
- Drinkable water
- Fruit juices (hot fill)
- Apple sauce (hot fill)
- Desserts
- Mayonnaise



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FILM COMPOSITION

To be defined together with the film manufacturer according to the characteristics of the product and the expected shelf life.

Film composition examples and protection levels:

Film composition	Light	O_2 (cc/m^2/day)	H_2O (cc/m^2/day)
PET / ALU / OPA / PE	Barrier	≅ 0	≅ 0
PET / ALU / PE	Barrier	≅ 0	≅ 0
↑			
ESL			
PET / PET metalised / PE	Medium	≅ 1 - 2	≅ 1 - 2
PET / PET ceramis / PE white or transparent	None	≅ 0’5	≅ 5
PET / PET / PE white	None	≅ 50	≅ 10
PET / PE white	None	≅ 100	≅ 50

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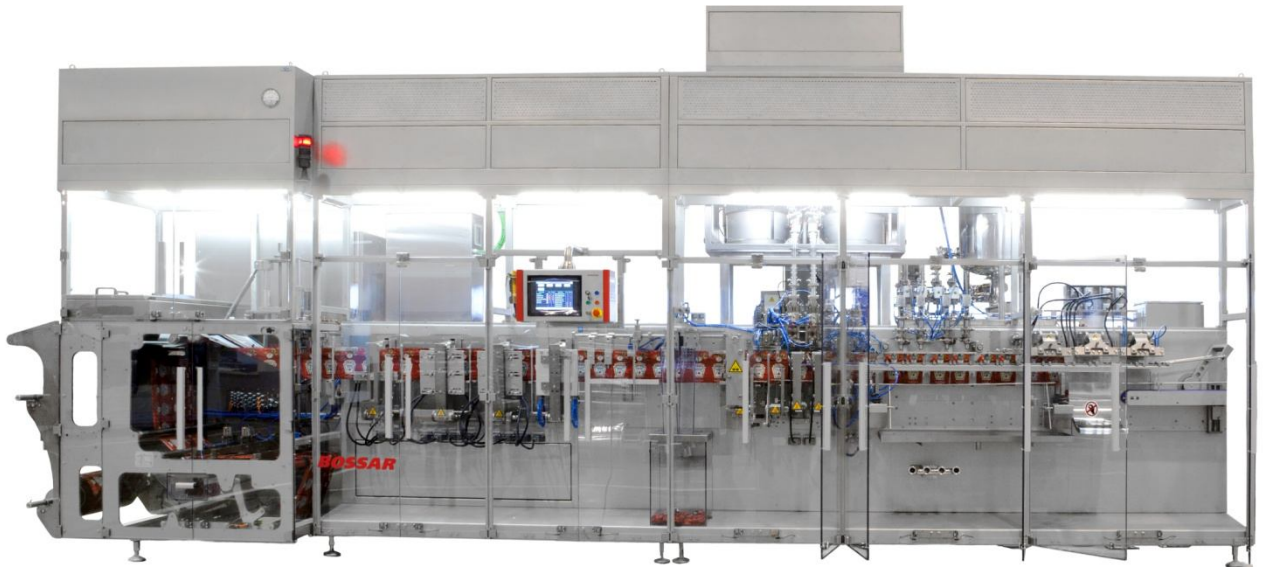
LEVEL 1: CLEAN (LAMINAR FLOW)

- Undefined supply chain system for products with certain level of chemical content.
- Laminar Flow protection: doubles product shelf life.
- U.V. Lamps for film decontamination.
- Approximate decontamination level in film:
  - → Log 3 Bacillus subtillis
  - → Log 1 Aspergillus Niger



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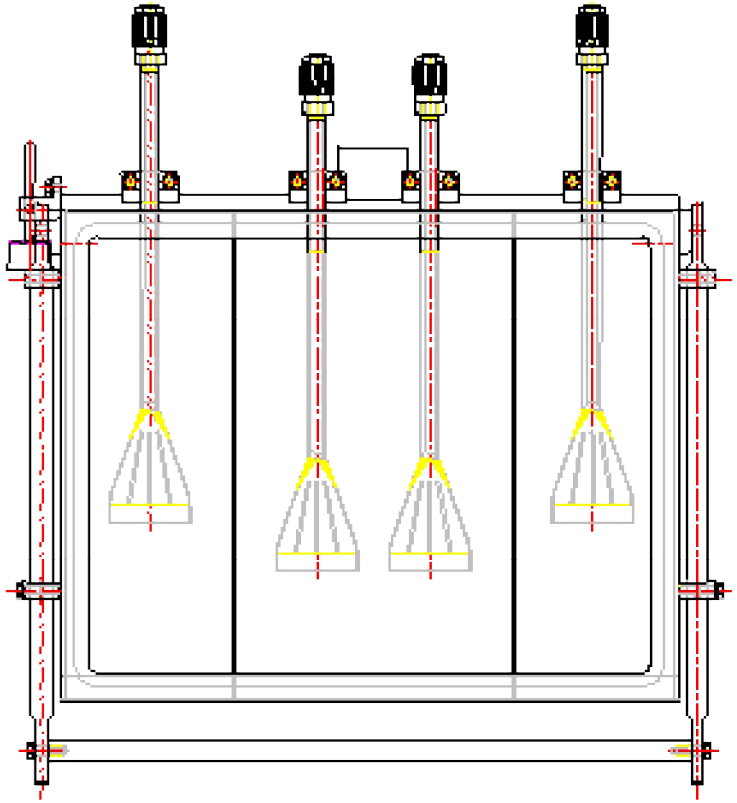
LEVEL 2: ULTRACLEAN

- Cold chain storage, and low chemical content
- Intender for high and low acidity products.
- Shelf life < 30 days.
- Decontamination system by VHP sterilisation.
- Approximate Decontamination level:

  → Log 3 Bacillus Subtillis

  → Log 3 Aspergillus Niger



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LEVEL 3: ASEPTIC

- No Cold Chain required.
- For both High and Low Acid Products.
- Shelf life from 1 to 12 months.
- Decontamination system by VHP sterilisation.
- Approximate Decontamination level:
  - → Log 5 Bacillus subtillis
  - → Log 5 Aspergillus Niger

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LOG REDUCTION OPERATIONS

ASEPTIC MACHINE:

- Sterilisation of packaging materials
- Sterilisation of packaging machine
- Maintaining sterility in the packaging machine

ULTRA-CLEAN MACHINE:

- Decontamination of packaging materials
- Disinfection of filling system
- Maintaining cleanness in the packaging machine

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ULTRACLEAN MACHINE FEATURES

- Hygienic Protection level: 2
- Capacity to decontaminate the packaging materials
- External machine Stainless Steel 304
- Machine backside easy to access for maintenance
- Hygienic design of filling unit. Inductive or mass flow meter filler
- Filling area: IP 55 rating. Water proof, low pressure cleaning
- Electric cabinet: IP 65 rating

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DECONTAMINATION

FILM:

- UVC Decontamination (inside face of the film)
- Microbiological reduction target: 3 log Bacillus Subtilis, 1 log Aspergillus Niger
- No residues

SPOUT:

- Dry Decontamination: H_2O_2 gas (both inside and outside)
- Microbiological reduction target: 3 log Bacillus Subtilis, 3 log Aspergillus Niger
- H_2O_2 residues < 0.5 ppm

(application of isolation technology for operator protection)

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FILM UV LAMPS

Manufacturer	HONLE
Model	UVATEC 300
Dimensions	Depending of total film width
UVC radiation intensity at 2 cm	Up to 700 mW/cm2
UVC range	230 – 285 nm
Lamp type	Medium pressure
Irradiation time foreseen (approx.)	< 1 second

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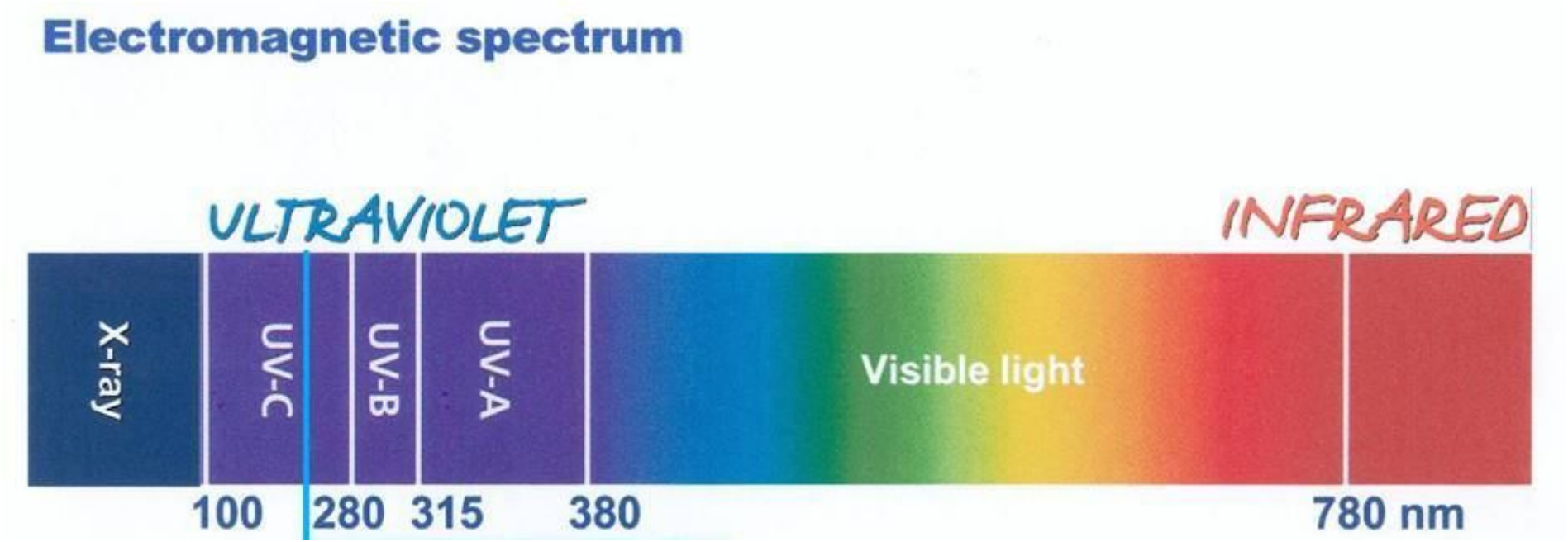
FILM UV LAMPS



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FILM UV LAMPS - MICROORGANISMS

Lethal dose for different bacteria

BACTERIA			
Bacillus anthracis	13,7	Pseudomonas aeruginosa	16,5
B. Megatherium sp. (veg.)	3,4	Pseudomonas fluorescens	10,5
B. Megatherium sp. (spores)	8,0	S. typhitmurium	24,0
B. paratyphosus	9,6	Sarema lutea	59,0
B. subtilis (spores)	36,0	Seratia marcescens	7,2
Corynebacterium diphteriae	10,0	Shigella paradysenteriae	5,2
Eberthella typosa	6,3	Spirillum rubrum	13,0
Escherichlia coli	9,0	Staphylococcus albus	5,4
Micrococcus candidus	19,0	Staphylococcus aureus	7,8
Micrococcus sphaeroides	30,0	Staphylococcus hemolyticus	6,6
Neisseria catarrhalis	13,0	Staphylococcus lactis	18,0
Phytomonas tumefaciens	13,0	Staphylococcus viridans	6,0
Proteus vulgaris	7,8		

Values for 3 log reduction

1 second exposure

99,9 % germs inactivation: $\left(\frac{mW}{cm^2} \times s\right)$

Lethal dose for different yeasts and fungi

YEASTS	
Saccharomyces ellipsoidens	18,0
Saccharomyces sp.	24,0
Saccharomyces cerevisiae	18,0
Brewing yeast	9,9
Baking yeast	11,7

FUNGI	
Penicillium roqueforti *(green)*	39,0
Penicillium expansum *(olive)*	39,0
Penicillium digitatum *(olive)*	132,0
Aspergillus glaucus *(blue-green)*	132,0
Aspergillus flavus (*yellowish)*	180,0
Aspergillus niger *(black)*	396,0
Rhisopus nigricans *(black)*	330,0
Mucer racemosus A *(light grey)*	51,0
Mucer racemosus B *(light grey)*	51,0
Oospera lactis *(white)*	15,0

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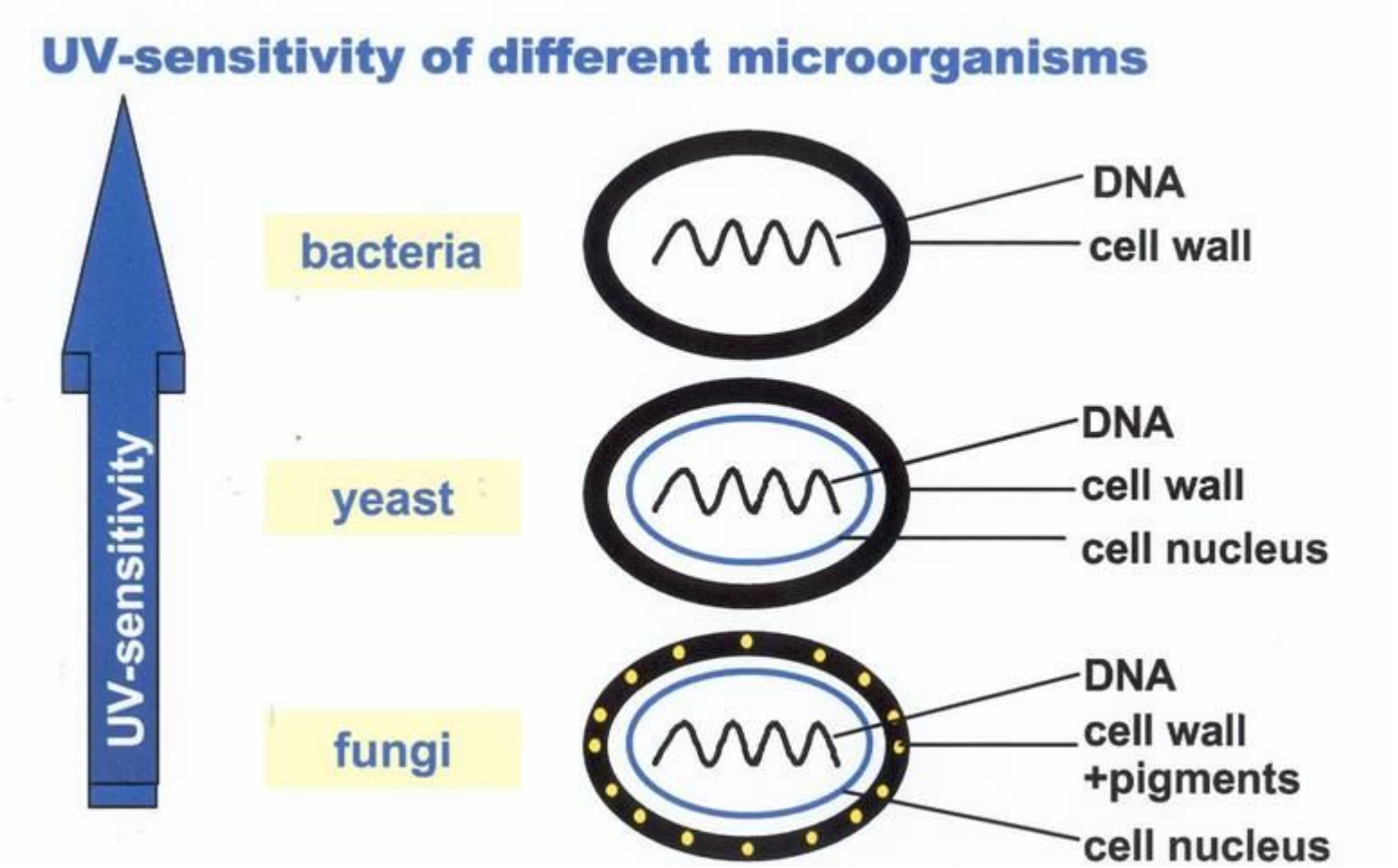
UV MICROORGANISMS SENSIVITY



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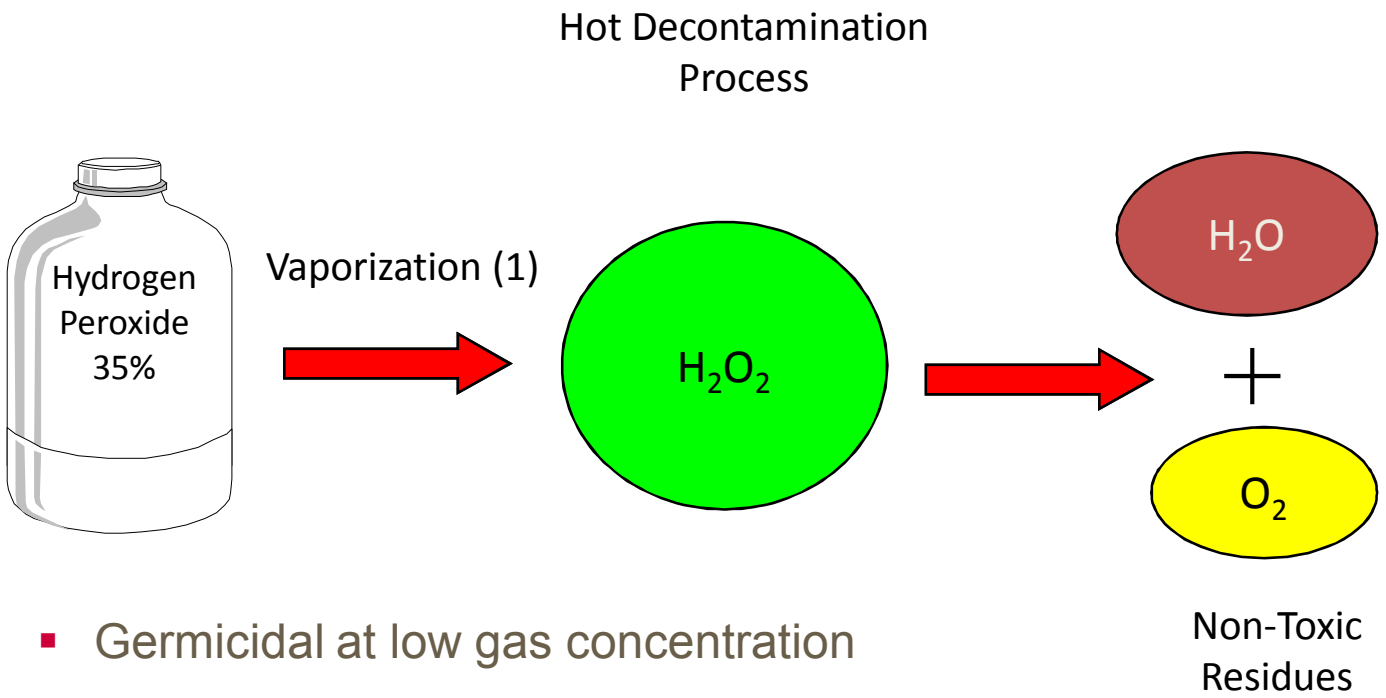
DRY DECONTAMINATION: H_2O_2 IN GASEOUS STATE



- Germicidal at low gas concentration
- Quick decontamination, short cycle times
- Low level of chemical residue
- Excellent material compatibility
- Bossar know how

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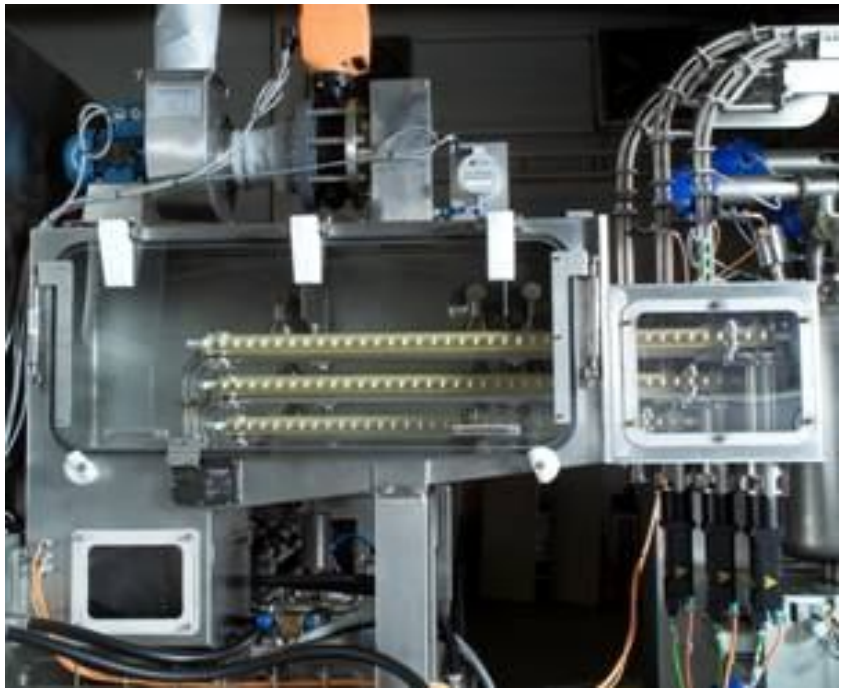
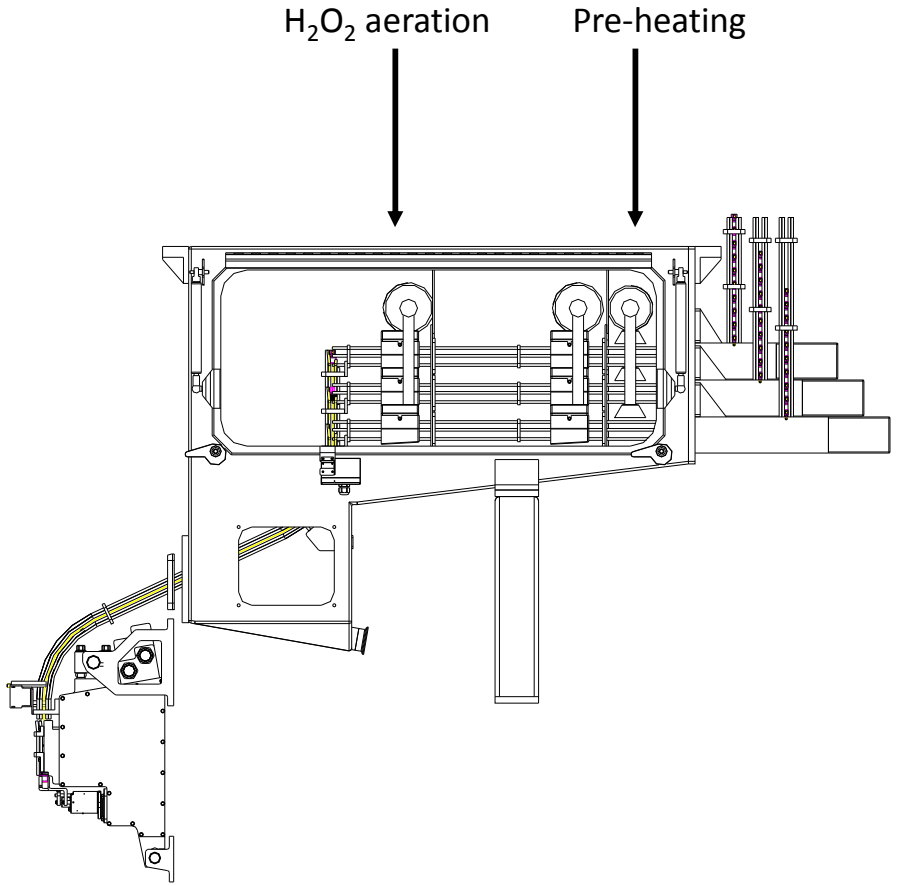
SPOUT DECONTAMINATION





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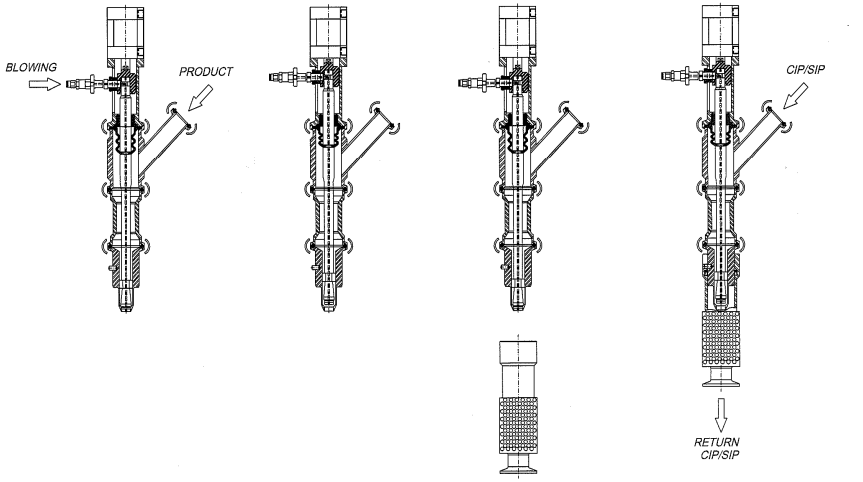
FILLING SYSTEMS FOR CLEAN & ULTRACLEAN

- Sanitary design of the complete filling system
- All product contact parts in Stainless Steel AISI 316L
- CIP and SIP application
- Types of fillers:
  - Inductive flow-meter
  - Mass flow meter
- Analogical or digital level detector
- Types of filling nozzles: non-drip, cut-off



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KEEPING STERILIZATION AFTER PACKAGING

Decontamination after packaging is very important to maintain the environment under controlled conditions. For this reason Bossar uses two systems:

- Protection of larger zones with vertical laminar flow like:
  - The pouch forming area (from the unwinder to the pouch cut-off)
  - The pouch filling area
  - For production of sensitive products, this covered machine can be installed in a clean room.

- Protection of critical zones by a containment cabin (Isolator) with turbulent ventilation:
  - Spout area decontamination with negative pressure (-10 Pa approx.)

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Thank you for your attention

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