

# **THE MELROSE HATCHERY SANITATION PROGRAMME**

The Poultry Industry recognizes the vital influence that individual chick health has on its efforts to bring birds to market profitably.

A team effort is required to produce a quality chick. Management of breeders and correct handling of eggs from the nest to the incubator must be programmed along with the technical information in this manual, which deals only with the hatchery environment.

## **THE NECESSITY FOR HATCHERY SANITATION**

Hatcheries experience a cycle of contamination during their production processes. This occurs when eggs are brought in from farms, are processed into incubators, and transferred into hatchers. The environment becomes grossly contaminated as the eggs are pipped, as hatching occurs, and during processing of chicks for delivery. Sanitation, disinfection and proper isolation are used to create the environment of reduced exposure to microbial contamination necessary for the continuous production of healthy chicks.

## **MICROBIOLOGY OF THE HATCHERY ENVIRONMENT**

Microorganisms of concern to the hatchery consist of a broad spectrum of gram positive bacteria, gram negative bacteria, fungi and viruses typically found in various phases of poultry production. Some of these organisms are specifically pathogenic to poultry while others are of lesser concern. Many are common contaminants of vegetation, soil, water and the atmosphere.

Some organisms, considered nonpathogenic outside of the egg, are capable of penetrating the shell, and once inside the egg may deteriorate the albumen, yolk, fluids, etc., converting these into toxins capable of killing developing embryos or affecting the viability of hatched chicks. Many "dead-in-shells," culls, and early mortalities occur in this manner.

The objective of sanitation in the hatchery environment is to maintain the lowest possible level of microbial contamination at all times.

## **GENERAL INFORMATION**

**SANITATION** is the physical removal of gross soils and the programmed cleaning of equipment, surfaces, floors, walls, etc. The net results should be a gross reduction of microbial contaminants to a relatively clean condition, at which time disinfection may be accomplished.

**DISINFECTION** is the application of a germicide to kill all remaining organisms and to establish residual bacteriostasis.

**RESIDUAL BACTERIOSTASIS** is an invisible film of active disinfecting agent left on all surfaces after disinfection to resist recontamination.

## **DISINFECTANTS**

Disinfectants are chemicals used to kill microorganisms (bacteria, fungi and viruses). All modern hatcheries use disinfectants to prevent disease and cross infections in the hatchery. Disinfectants are used because their effect nets an economic gain to management.

When selecting a disinfectant for the hatchery, one must consider broad spectrum germicidal activity and residual bacteriostasis. It is important that the disinfectant kills *Escherichia coli*, *Proteus sp.*, *Pseudomonas sp.*, *Staphylococcus aureus*, *Salmonella sp.*, common poultry viruses, common environmental moulds and the pathogenic mould, *Aspergillus fumigatus*.

Since the hatchery environment is ideal for microbial growth, it is essential not only to use an adequate amount of disinfectant to kill the resistant poultry pathogens, but it is essential also to leave bacteriostatic surfaces (residual bacteriostasis). This is to inhibit normal regrowth of microbial contaminants.

## **PROGRAMMING DIRECTION**

Hatcheries have specialized problems in sanitation and disinfection. Soils, equipment, potential pathogens and the possible portals of entry of these pathogens into the hatchery environment are unique to the poultry industry. Effective sanitation chemicals and disinfectants and their methods of use require specific knowledge of the hatchery environment.

Sanitation requirements and recommended practices also vary from hatchery to hatchery because of location, equipment, materials, flow of materials, or special disease problems. An in-plant study by Management and Melrose Technical Representation is necessary for the most efficient utilization of production personnel, equipment and products for any plant.

This programme represents the composite experience of many years of in-plant operation in hundreds of hatcheries, along with continuous massive field bacteriological testing and coordinated record keeping

## **THE MELROSE PROGRAMME ENCOMPASSES**

1. DECONTAMINATION - The proper removal of bulk waste and surface soils.
2. CLEANING AND SANITATION - The scrubbing and rinsing of equipment and the physical plant to remove adhering soils from the surfaces and to lower initial levels of contamination.
3. DISINFECTION AND RESIDUAL BACTERIOSTATIC TREATMENT - The final application to precleaned surfaces to kill on contact remaining bacteria, fungi, and viruses and to establish the residual bacteriostatic conditions necessary to inhibit microbial regrowth.
4. HATCHERY FOGGING SYSTEM. A simple, semi-automated method of aerosolising an effective residual disinfectant into the atmosphere and onto surfaces. The system is recommended for setters, hatcher, egg rooms and other hatchery rooms. It cleanses the atmosphere and activates and reinforces bacteriostasis on surfaces.
5. ISOLATION - The utilization of maximum physical in-plant separation of the stages of chick production and the complete isolation of field personnel, visitors, etc., from the hatchery work areas.

## **THE PRIMARY PRODUCTS AND THEIR PURPOSES**

**DEAMY** Disinfectant-Cleaner-Sanitiser-Virucide-Fungicide-Mildewstat-Deodorant is specifically formulated for general cleaning and gross reduction of microorganisms throughout the entire incubation plant.

**MULTI-PHEN** Concentrated Multi-Phenolic Disinfectant is specifically formulated to be used as a final treatment to kill on contact a broad spectrum of bacteria, fungi and viruses known to be pathogenic to poultry and to create residual bacteriostasis for inhibition of microbial regrowth.

**IX-91** Concentrated Iodophor is specifically formulated to be used in conjunction with either DEAMY or MULTI-PHEN as an alternate disinfectant to prevent resistance in micro-organisms. The other main use in poultry facilities is as a shoe bath disinfectant and as a sanitiser for poultry drinking water.

**OXYCLEAN** and **OXYCLEAN ML** are blends of detergents and sanitisers specially formulated for use in automatic tray washing machines.

**DO-79** is used to clean and treat offal containers, loading dock areas and floor drains.

**BRITE-ALL** is used for removal of scale deposits from areas where they occur.

**PEC 9220** is used to clean poultry equipment such as drinkers, feeders, roosts, nests and related equipment.

**SUPER FOG** is a flying insect insecticide based on natural pyrethrins.

## EQUIPMENT FOR USE WITH THIS PROGRAMME

**HATCHERY FOGGING SYSTEM** - is to be installed for automatic internal treatment of each incubator to assure that proper disinfection and residual bacteriostasis are maintained. Consult your Melrose Technical Representative for proper installation and proper use in your machines and rooms. (See page [6](#) for more details).

**VACUUM CLEANER** - A heavy duty industrial vacuum cleaner capable of both wet and dry pickup is to be used for general removal of soils and, specifically, for dust control.

**1000 psi PRESSURE WASHER** - A portable, high pressure cleaning system with proper attachments for flushing away adhering soils from most surfaces (within the hatchery environment) and for distribution of detergents and disinfectants in certain phases of in-plant sanitation.

**TRI-JET FOGGER** - Used for in-plant atmospheric treatment. Capable of reducing disinfecting solutions down to micron size necessary for effective decontamination of room areas.

**DRUM BUGGY** - To make DEAMY, MULTI-PHEN and IX-91 readily available in proper dilutions.

**MISCELLANEOUS CLEANING EQUIPMENT** - Such as brushes, sponges, mops, buckets, brooms, incidental to general cleaning needs.

## PROCEDURES

**DILUTION FACTORS** - The following dilution factors are to be used throughout this programme unless otherwise specified:

1. **DEAMY**
  - (A) 4 ml per Litre of water for general cleaning and sanitising.
  - (B) 1 ml per Litre of water for sanitising.

2. **MULTI-PHEN**
- (A) 4 ml per Litre of water for disinfection and residual bacteriostasis.
  - (B) Hatchery Fogging System (refer to page 6 for proper programming).
  - (C) TRI-JET FOGGER: 2 ml per Litre of water.
3. **IX-91**
- (A) 2 ml per Litre of water for general cleaning and sanitizing.
  - (B) 1 ml per Litre of water for sanitizing poultry drinking water.
  - (C) 20 ml per Litre of water for shoebath sanitation.

## **EGG RECEIVING, HOLDING AND PROCESSING AREAS**

Egg delivery personnel should be permitted into the egg receiving area only and prohibited from entering other parts of the incubation plant. If such personnel must enter the hatchery, facilities should be provided for showering and a complete change of clothing, including footwear.

As floor areas become accessible, remove soils by vacuuming, sweeping, flushing, etc. Then mop with DEAMY. Treat this room daily using MULTI-PHEN through the Hatchery Fogging System. The unit should operate a sufficient period of time to create a dense fog in the atmosphere. The preferred time for treatment is at the conclusion of the day's activities.

Where pallets are in use, a cleaning and disinfecting cycle should be established so that each pallet receives a treatment once weekly. Use the PRESSURE WASHER for cleaning, followed by liberal spraying with MULTI-PHEN or IX-91.

When vacuum traying mechanisms are used, cups should be cleaned after each problem flock and at the end of each day using DEAMY. Then, rinse thoroughly and allow to air dry.

## **THE INCUBATION ROOM AND EQUIPMENT**

A functional internal Hatchery Fogging System is an essential part of this programme. Bacteriological tests should verify the initial effectiveness of the system and periodical tests should be taken from individual incubators to assure that continuous uniform residual bacteriostasis is being maintained in all units.

Once weekly all accessible walls, floors, ceilings, fan boards, fan blades, humidity ducts and drip pans of each incubator should be cleaned with DEAMY, rinsed with clear water and mist sprayed with MULTI-PHEN. Rinse bucket, brush, sponge, etc., and use a fresh solution of DEAMY for each machine.

Water sources of high mineral content may cause scale formation. This should be removed as needed using BRITE-ALL. Using a small brush or dauber, apply a 10% solution until all deposits have been dissolved, then rinse thoroughly using DEAMY. The use of rubber gloves is recommended with BRITE-ALL and care should be exercised to avoid contact with eyes and skin.

## **THE HATCHERY ROOM AND EQUIPMENT**

All chicks should be removed from the hatching room area before starting the clean-up. Pulling chicks from one machine while dumping waste material from another is undesirable.

After chicks have been removed, be sure that the doors of the hatcher room are kept closed except when in use. All removable parts should be taken from the machine. Waste matter should be removed, preferably by vacuum cleaning to minimize dispersion of dust and down.

Flush away remaining soils and dust with clear water. Then, apply a wetting concentration of DEAMY solution, and allow a few minutes for the solution to soften any remaining soil. The entire machine should be washed with the high pressure cleaning system or cleaned with a bristle brush or sponge and then rinsed with copious amounts of clear water. Finally, apply a MULTI-PHEN or IX-91 solution to all pre-cleaned surfaces.

## **CLEANING TRAYS, PLASTIC FILLER FLATS AND CHICK BOXES**

**Machine Washing:** OXYCLEAN or OXYCLEAN ML are detergent/sanitiser specifically formulated for use in in-place washing equipment. Since several types are on the market, it is best to consult your Melrose Technical Representative to establish correct use dilutions. Wash water should be laboratory tested periodically to assure that microbicidal activity is being maintained. Trays, etc., should be dipped for one full minute in a solution of IX-91 diluted at 2 ml per Litre of water or sprayed thoroughly with MULTI-PHEN diluted at 4 ml per Litre of water.

**Tank Washing:** A three compartment tank is recommended for hand washing of hatcher and setter trays. Compartment One will contain DEAMY (1 Litre per 250 Litres of water). Compartment Two will contain rinse water. Compartment Three will contain IX-91 (½ Litre per 250 Litres of water) Trays are washed in DEAMY, rinsed with clear water and dipped in IX-91 for a minimum of one minute. Your Melrose Technical Representative can demonstrate the handling procedures for hand washing of trays.

## **CLEANING AND SANITISING OF FLOORS**

Remove soils in whatever manner will best minimize dust dispersion. Use a PRESSURE WASHER to clean surface soils from floors. Following cleaning use TRI-JET FOGGER to mist spray MULTI-PHEN or IX-91 over the entire floor, forcing solution behind baseboards, moldings, into corners, etc.

Dilute DO-79 ½ Litre to 20 Litres of water and pour approximately 2 Litres into each floor drain once weekly.

## **TREATMENT OF WALLS, CEILINGS, ETC.**

Once weekly use the PRESSURE WASHER to wash down walls and apply MULTI-PHEN or IX-91 solution. Use good judgement in not wetting electrical conduits, control panels, switches, outlets, synthetic wall board, ceiling materials, or any other surface that might be damaged by water.

## **ATMOSPHERIC DECONTAMINATION**

Following each day's activity, the atmosphere of every room should be decontaminated using MULTI-PHEN or IX-91 through the TRI-JET FOGGER or the Hatchery Fogging System.

## **CLEANING AND SANITIZING OF CHICK BUSES**

Use the PRESSURE WASHER to clean soils from the interior and exterior of chick buses. Then apply MULTI-PHEN or IX-91 to the interior, being careful not to wet surfaces that water might damage.

## **EVAPORATIVE COOLERS AND DUCT WORK**

Since evaporative coolers and ductwork are custom installations, consult your Melrose Technical Representative to establish programming for these areas.

## **TREATMENT OF OFFAL CONTAINERS AND LOADING DOCK AREA**

Dilute DO-79 ½ Litre to 20 Litres of water and apply liberally to precleaned egg shell cans, loading docks, etc.

SUPER FOG should be fogged with the TRI-JET FOGGER and may be used for flying insect control when required. Do not apply insecticide to the offal or interior of containers if the material is being processed by a rendering plant.

## **MELROSE HATCHERY FOGGING SYSTEM**

A Unique Sanitation Concept

The poultry industry has long recognized the need for new technology to limit exposure of baby chicks to massive numbers of bacteria and fungi during incubation and the first few hours of life, the period of high susceptibility.

Major factors complicating the development of effective control measures have been: (1) the great amount of organic matter present during the hatching cycle; (2) temperature and humidity conditions ideal for rapid reproduction of microorganisms; (3) the toxicity of many disinfectants toward chicks and the developing chick embryo.

Safe, effective control of contamination within the setter and hatcher environments is now possible by use of the Melrose Hatchery Fogging System. MULTI-PHEN or IX-91 is introduced through a pneumatic nozzle into setters on a daily basis and into hatchers after transfer and every twelve hours thereafter.

Several years of development and exhaustive field studies in conjunction with thorough bacteriological evaluations proved significant reductions of bacteria and fungi both in the atmosphere and in chick fluff during the actual hatching process. Results from some typical field studies are summarized in tabular form on the following page.

The Hatchery Fogging System constitutes a new phase of Melrose's Hatchery Sanitation Programme to improve chick quality through gross reduction of microbial contaminants during incubation.

Average percent reductions of microbial contaminants effected in the atmosphere and hatchery fluff during the final stages of hatching (24 - 48 hours past transfer) by using the Hatchery Fogging System. (All eggs within a given trial were from the same flock).

Trial #	Average Percent Reductions <sup>(a)</sup>			
	Aerobic Bacteria (atmospheric)	Bacteria (fluff)	Coliform (fluff)	Fungi (fluff)
1	90%	84%	C.N.C. <sup>(b)</sup>	C.N.C.
2	70%	84%	C.N.C.	88%
3	72%	94%	100%	C.N.C.
4	70% <sup>(c)</sup>	93%	98%	83%

<sup>(a)</sup> Average Percent reductions were calculated as follows:

$$\frac{\text{Counts from unfogged machines} - \text{Counts from fogged machines}}{\text{Counts from unfogged machines}} \times 100$$

<sup>(b)</sup> C.N.C. could not calculate since organisms were too few to count in treatment and control groups

<sup>(c)</sup> counts from control hatchets were too numerous to count, making a more precise determination of the percent reduction impossible.

## INSTALLATION OF MELROSE HATCHERY FOGGING SYSTEM

The pneumatic nozzle should be positioned in the machine to give (1) maximum distribution of the disinfectant and (2) maintenance employees' easy access to the nozzle. The nozzle should not be placed so the main stream of the fog will be directed toward controls, eggs or painted surfaces. Nozzle locations vary due to the physical layout of the hatchery, the type of machines and personal preference.

Suggested locations for pneumatic nozzles in various types of incubators:

### SETTERS

#### ROBBINS

Nozzle placed against side wall in lower right front corner of machine directed in front of doors. Bottle on floor.

#### JAMESWAY BIG J

Unloading end of machine, above door height, directed toward centre aisle. Bottle inside or out.

#### BUCKEYE-CHICKMASTER-STABIL

Nozzle over the front door directed at a downward angle (45°) toward rear of machine. Bottle outside above door height.

### HATCHERS

Nozzles are normally placed in the top front portion of the hatcher with the fog directed toward rear of the machine, an equal distance between top of racks and top of machine. The bottle should be placed outside on front or on top of the machine.

#### CHICKMASTER 60 & 90

Tray hatcher should place the pneumatic nozzle in the plenum chamber.

#### BIG J

Nozzles may be placed flush against the front center panel directed toward rear of hatcher.

## DISINFECTANT USE DIRECTIONS

**Stock Solution:** 2 ml IX-91 added to 1L. water makes one Litre stock solution. Alternatively 4 ml MULTI-PHEN added to 1L. water makes one Litre stock solution

**Fogging Frequency:** Hatchers immediately after transfer. Every 12 hours thereafter. Setters daily.

## EQUIPMENT REQUIREMENTS

Air Compressor (1 cu. ft. per nozzle @ 40 psi. Large installations can be divided to fog a portion of the machines at one time.)

Copper Tubing, Tee's, Ell's, & Gate Valves (as required)

## MACHINE REQUIREMENTS

### CHICKMASTER

#### Setters

65	150 ml stock solution
78	200 ml stock solution
99	250 ml stock solution

#### Hatchers

30 Tray	100 ml stock solution
90 Tray	250 ml stock solution

### ROBBINS

Setters 150 ml stock solution

#### Hatchers

H5	100 ml stock solution
H10	150 ml stock solution
H15	250 ml stock solution

### JAMESWAY

#### Setters

Big "J"	250 ml stock solution
1080	100 ml stock solution

#### Hatchers

Big "J"	250 ml stock solution
1080	200 ml stock solution

### BUCKEYE 66

Setter 150 ml stock solution

Hatcher 150 ml stock solution

**BUCKEYE 99**

Setter 250 ml stock solution

Hatcher 150 ml stock solution

**EGG SWEATING**

Egg sweating is a very common problem in the handling of hatching eggs. Every untreated egg shell has a high count of microorganisms on the exterior egg shell surface, some motile and some nonmotile. Motile microorganisms include Pseudomonas, Coliform, Proteus sp., Bacillus sp. and many Salmonella sp.

When moisture condenses on the egg shell, the chances of shell penetration are increased resulting in exploders, black rots, reduced hatchability, increased dead-in-shells, increased culls, early mortality and morbidity. The total effect is a higher level of contamination of the hatchery operation and increased opportunities for cross-infection.

Sweating results from a cold egg entering a warm moist atmosphere. Compromises in recommended temperature and relative humidity may be required in order to minimize sweating. The chart below provides combinations when sweating will occur.

		<b>TEMPERATURE (°C) OF EGGS AS TAKEN FROM COOLER</b>			
		13	15	18	21
		<b>% relative humidity (approximately) at or above which sweating will occur.</b>			
<b>TEMPERATURE (°C)</b>	38	22	28	32	38
	35	27	32	38	45
	32	31	37	44	52
	29	36	43	51	61
	27	42	51	60	72
	24	50	60	71	85
	21	59	70	83	100

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