

# MEAT RESEARCH NEWS LETTER

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## FOAM CLEANING

A recommended procedure for the cleaning and sanitation of meatworks was outlined in Meat Research News Letter 70/4, and it was suggested that one way of applying detergent to the surface to be cleaned was to use foams.

### What is Foam Cleaning?

Foam cleaning is no more than a method of applying a detergent solution to the surface to be cleaned. It should not be regarded as a magical procedure whereby foam is thrown over all work surfaces and then all soil is just rinsed off to leave a perfectly cleaned surface. It is only one step in a cleaning procedure, allowing a small quantity of the chosen detergent to be spread over a large area, to give a greatly increased contact time with the dirt to be removed and to provide visual evidence that the detergent has reached all surfaces.

### The Advantages of Foam Cleaning include:

- Cost saving in detergent used compared to other methods of application.
- Reduction in water used.
- Reduction in labour.
- A much longer contact time of detergent.
- Visual evidence of areas covered.

- It enables the cleaning of areas (e.g. walls, ceilings) which are difficult to reach.

The Disadvantages include:

- The initial capital expenditure.
- Heavily soiled surfaces cannot be cleaned without mechanical action.

In areas of heavy soilage (e.g. fat build up, scaling on equipment), some mechanical action will be necessary to allow the detergent to emulsify and suspend the dirt from the surfaces. In all cases mechanical action will greatly assist the speed with which the detergent will perform its task. In short, there is no substitute for hard work in the removal of dirt be this supplied by good old fashioned elbow grease, or by the use of high pressure rinse water to the softened dirt.

Equipment for Producing Foams

Foams are formed in special equipment by the action of compressed air on a dilute solution of detergent and foaming additive. There are several brands of equipment for the formation of foams and these fall into 3 basic categories.

(1) Venturi-feed Foam Guns (e.g. Dema Foam Gun, Gibson Microfoamer, Oakite Drum Type Foamizer).

A concentrated detergent solution and foam additive is drawn into a water stream by the vacuum created by water passing through a Venturi valve, and the detergent and foam additive mixes with the water stream to make a dilute detergent-foam additive solution. This is passed by venturi effect into a stream of compressed air and foam is formed.

There are some disadvantages of the venturi feed system and these include:

- A limitation on the strength of a detergent solution that can be prepared in a concentrated form, and a consequent limitation on the strength of the detergent in the foam.
- Highly concentrated solutions of solid detergents are harder to dissolve, with consequent clogging of the inadequately sized filters provided (too small in surface area and usually the holes are too large).

- Undissolved detergent particles clog the valve entry into the water stream with resulting failure to operate, or reduced performance.
- The equipment needs fairly constant flowing air and water pressures to create stable foams. Fluctuation in either pressures can result in rapid changes in the nature of the foam from sloppy liquid to dry floating foam.

The advantages of this type of equipment are:

- Low cost relative to other types (generally range \$90 - \$150).
- Easy maintenance; simple to dismantle to effect running repairs.
- Entire assembly is stainless steel, with no glands or seals.

(2) Pressure-fed Foamer (e.g. RTM Foamer)

A concentrated detergent-foam additive solution is forced by air pressure from a pressure vessel via a regulating valve into the water stream. The supply of detergent solution can be seen in a glass-covered sight vessel. The dilute detergent-foam additive solution is then foamed in a chamber by forcing the detergent through a valve into the air stream.

The advantage of this equipment is:

- Less chance of variation in balance of water and air pressure. However, where water pressure fluctuates greatly, difficulty in regulating is still encountered.

The disadvantages are:

- The unit requires higher concentrations of foam additive to achieve satisfactory foams than is required by either the Venturi-feed equipment or the air-pressure pump equipment.
- The pressurized chamber holds a volume of about 3 gallons and requires frequent refilling. This involves releasing the pressure.

(3) Air-pressure Pump Fed Foamers (Graco Pressure Pump with foaming unit, Applied HV Foamer).

A dilute solution of detergent and foam additive is pumped at the desired rate (this can be varied) through a valve into an air stream in a foaming chamber. By varying the delivery speed of the air pressure operated pump it is possible to make a foam to the desired consistency and stability.

The disadvantages of this type of equipment are:

- High initial cost (\$850 - \$1200).
- The need to make detergent solutions frequently, 40 gallons of prepared detergent solution will cover approximately 6,000 sq. ft.
- With moving parts there is a possibility of mechanical problems. These air pressure pumps are reported to give difficulty with glands and seals but no trouble has been reported in the meat industry.

The advantages of this type of equipment are:

- Operates on air pressure only and therefore is not affected by water pressure.
- It is possible to make more concentrated detergent foams than with the other types of unit because the detergent is foamed directly from the reservoir.
- Detergent solutions can be heated to desired temperature in the reservoir before application.
- By simple adjustment, the pressure pump can be used as a high pressure rinsing or detergent application system.
- The equipment can be operated at pressures of about 80 psi, and at higher pressures can spread the detergent foam quickly allowing much faster coverage of areas.

The type of unit to choose will be dependent largely on the scale of operations. In a small boning operation without compressed air supply for example, it would probably be economically impractical to purchase even a small unit because of the cost of a compressor.

### Foam Additives

All detergent manufacturers stock one or more foam additives to mix with detergents for use in the foam generating equipment. These materials vary greatly in cost, and in the quantity needed to make satisfactory foams. It is advisable to check the compatibility of the detergent proposed for use with the foaming additive before any attempt is made to use it in cleaning operations. In general, acidic detergents and highly alkaline detergents (or high concentrations of mildly alkaline detergents) require more foam additive to create stable foams. The use of warm to hot water (120 - 140°F) results in more generous production of foam from an equivalent concentration of foam additive than is obtained with cold water.

### Stability of Foams

The stability of a foam is determined by the type of foam additive, the type of detergent and its concentration, the temperature of the water, the ratio of detergent to water, the type of surface it is foamed onto (smooth or rough), the temperature of the surface (hot or cold) and there are probably many other factors affecting the stability of the foam.

### General Points on Foam Cleaning

Foam should be regarded as a maintenance cleaning method. It will not successfully clean very dirty surfaces. It will maintain clean surfaces if they are foamed regularly and if there is judicious use of the appropriate alkaline and acid detergents. The method is rapid and permits one to cover relatively large areas (e.g. chillers, meat markets) with reasonable speed.

Most standard equipment throws out a concentrated stream, but by modification to the nozzle it has been found possible to spread foam evenly and thinly to give a larger coverage in a shorter time. A design for a wand to incorporate a commercially available nozzle is available from the Laboratory and this will spread foam in a 6 - 8 ft. span dependent on the air pressure.

A technical report 2/70 on evaluation of foam-additives and foaming equipment has been issued to industry and this gives some more detailed information.

The savings in labour and detergents and the results attainable using foams as part of a cleaning method are impressive and management would be well advised to consider foam cleaning.

NEWS JOTTINGS:

CORRECTION! - some alert industry people have noted an error in our News Letter 70/8 on Dry Rendering. Page 2 third paragraph should read "Steam consumption varied between ----- 0.66 - 0.72 lb steam/lb charge material of 55% water content".

The International Organisation for Standardisation has put out a number of recommendations concerning analysis of meat and meat products, including animal fats:

- R 932 Animal Fats - Determination of Insoluble Impurities.
- R 933 Animal Fats - Determination of Moisture and Volatile Matter.
- R 934 Animal Fats - Determination of Water.
- R 935 Animal Fats - Determination of Solidification Point of Fatty Acids (Titre).
- R 936 Meat and Meat Products - Determination of Ash.
- R 937 Meat and Meat Products - Determination of Nitrogen Content.

Copies can be obtained through The Standards Association of Australia, Standards House, 80 Arthur Street, North Sydney, 2060.

The Next News Letter will be CLA (Cheesy Gland).