

Steam Vacuum

FOOD SAFETY TECHNOLOGY SUMMARY	
Status	Currently Available
Location	Post slaughter
Intervention type	Spot treatment
Treatment time	5 seconds
Effectiveness	Good results if used correctly
Regulations	Approved in US and Australia, achieving acceptance in the EU.
Likely Cost	A\$100,000 +
Value for money	Fair to good
Plant or process changes	Requires personnel to operate Can be included in most existing configurations
Environmental impact	Energy is required, and water to produce steam. Small amounts of liquid effluent are produced
OH&S	Although steam is produced, the risk of scalding is low. Manual handling training may be required to prevent repetitive strain injuries
Advantages	Less expensive than most interventions Can be directed at visibly contaminated areas Possible robotic installations in the future
Disadvantages or Limitations	Condensation may be an issue if area not well ventilated. Some bleaching of meat surface but not permanent discolouration

Steam Vacuum

Steam vacuuming uses steam and/or hot water to loosen soil and kill bacteria, followed by application of a vacuum to remove contaminants. The effectiveness of steam vacuuming depends on employee diligence of application and the operational status of the equipment. It is only useful when applied to specific areas of the carcass that are visibly contaminated i.e. it is not conceivable to 'vacuum' the whole carcass.

Steam vacuum systems are used in Australia for removal of wool fibres and wool dust from sheep carcasses but they are used infrequently as interventions for beef sides. AQIS Meat Notice 98/1 states that the unit must be used for localised 'spot' treatment only and should be applied to a particular area of the carcass surface for a five-second contact time.

The equipment is a hand held device consisting of a vacuum wand with a hot spray nozzle, delivering water at 88-94°C to the carcass surface under pressure, while simultaneously vacuuming the area (Dorsa *et al.* 1996a; 1996b). These authors found that the technique reduced the aerobic plate count by 3 log (6.2 log cfu/cm² to 3.2 log cfu/cm²), total coliform count by 4.0 log (5.0 log cfu/cm² to 1.0 log cfu/cm²) and *E. coli* count by 4.0 log (4.8 log cfu/cm² to 0.8 log cfu/cm²) on artificially inoculated beef short plates. Other researchers have found aerobic plate counts and total coliform counts to be reduced by 1.1-2.3 log and 1.2-2.2 log respectively using two different hot water/steam vacuum systems, (Kochevar *et al.* 1997). Some bleaching of the carcass surface was noticed using the system, but this was not a permanent discolouration. Further trials have shown steam vacuuming to be very effective at reducing the number of *E. coli* O157:H7 on beef (Dorsa *et al.* 1996a). It has gained wide acceptance by the US industry as an effective tool for spot treatment on the slaughter floor prior to final inspection and chilling (Huffman 2002), and is approved by USDA-FSIS as a substitute to knife trimming for removal of faecal and ingesta contamination where spots are <2.54cm diameter (Huffman 2002). It is applied prior to chilling; trials on use after chilling failed to remove artificially inoculated *Salmonella* organisms, possibly because the organisms had been allowed the time during chilling to become firmly attached to the surface and form biofilms (Bacon *et al.* 2002).

Proponent/Supplier Information

Hand-held steam vacuum units are available from Kentmaster (the Vac-San system), and from Jarvis ANZ (the CV-1 system).



Meat Industry Services

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References

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