

**Title** Heat treatment for disinfestation of empty grain storage bins  
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#### **Abstract**

An alternative to fumigants and insecticides for controlling stored-product insects in empty grain storage bins prior to filling is heat treatment, in which the temperature is quickly raised to a minimum of 50 °C and held there for 2–4 h. Effectiveness of heat treatment on empty grain storage bins was evaluated for five commercial propane and electric heat-treatment systems by measuring air temperature and associated mortality of *Tribolium castaneum* (Herbst), the red flour beetle, *Sitophilus oryzae* (L.), the rice weevil, and *Rhyzopertha dominica* (F.), the lesser grain borer, exposed for different time intervals. Eleven locations, six above and five below the drying floor, were monitored for air temperature and associated mortality of the three insect species, using arenas initially stocked with live adult insects. Data were analyzed separately for each heating system, with floor location and time interval as main effects for insect mortality. A high-output propane heater (29 kW) produced 100% mortality in 2 h for the three insect species at all test locations. An electric duct-heater system (18 kW) also produced 100% mortality at all test locations after 40 h when aided by a complicated interior heat-distribution system. The other three systems produced less than 100% mortality.