

Title Surveyed air temperature variability in refrigerated shipping containers
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Abstract

Surveys of refrigerated containers loaded with pallets of ZESPRI kiwifruits where air delivery temperatures were monitored for both spatial and temporal variability were conducted. Intensively monitored containers utilized 18 thermocouples, placed evenly across the width of the container in the floor channels. The thermocouple sensors were connected to dataloggers and recorded at 10-minute intervals. Industry monitored containers utilized 4 dual-channel HOBO dataloggers, spaced evenly across the container in the floor channels, programmed to record at 5-minute intervals. Oxygen concentration within the containers was monitored at four points using oxygen sensors and a datalogger. The temperature set-point of the containers during testing was 20 deg C. After flushing, oxygen concentrations were monitored for a minimum of one hour with the air exchange vent closed, followed by the minimum vent setting. In the air exchange vent testing, for containers with a vent setting of 15 m³/h, measured rates ranged from 3 to 55 m³/h. The impacts of such variability can be two-fold; too low with a high respiring product, and the potential for CO₂ build-up exists; too high coupled with a long duration between defrosts and with high temperature and humidity external air, and the chance of differential coil frosting exists, along with much lower overall energy efficiency of the container.