

SEALING EFFICIENCY ASSESSMENT IN MODIFIED ATMOSPHERE STORAGES

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The leak area that would permit air infiltration into an experimental silo of 665.7 litre capacity was assessed with constant pressure tests (on) using cross-section areas ranging between 22.99 and 10005.96 mm². The relationship between orifice cross-section area and its length, on the variations of the empirical constants that describe the constant pressure test was also demonstrated. Based on a series of tests an empirical equation to estimate leak rate area was proposed as a guideline.

The experimental silo which was filled to 92% of its volume with ca. 500 kg wheat was tested for Carbon dioxide (CO₂) loss using different sized orifices. The measured CO₂ concentrations were compared with the calculated values based on equations that consider initial CO₂ adsorption by the wheat, diffusion of CO₂ through the leak, and variations in temperature and barometric pressure. Under the experimental conditions close agreement between the measured and calculated values was obtained. The influence of temperature and barometric pressure variation on infiltration of air into the silo was also analyzed. The information obtained from the constant pressure tests and from analysis of the weather conditions provided guidelines on the time that a certain concentration could be maintained in a CO₂ treated structure. Leak rates for any structure may be assessed by the method developed in these experiments.