Devices for Sampling Oxygen in Sealed Storage Containers

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Background

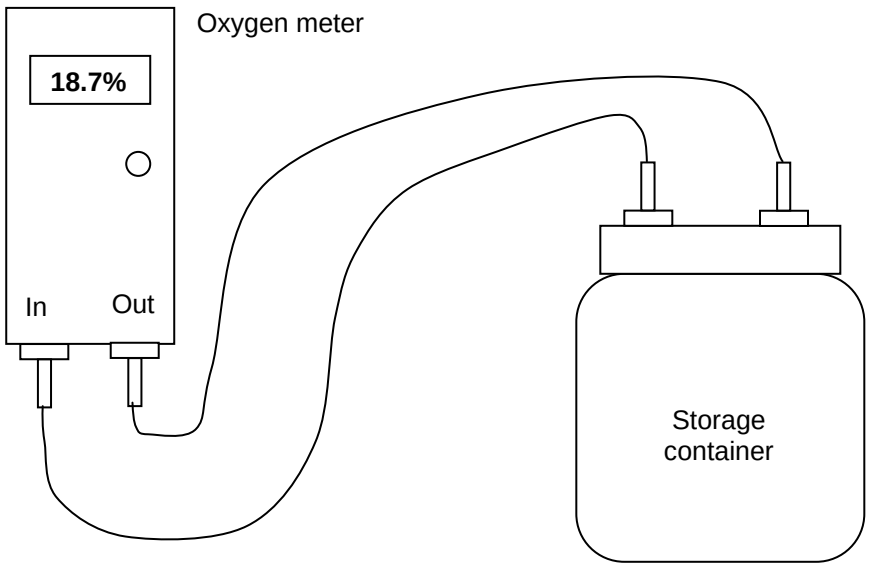
By monitoring the oxygen level inside hermetic sealed storage containers one can easily draw conclusions about whether the container is sealed properly. The smaller the container the more important it becomes not to disturb the atmosphere inside the container too much during sampling. If the oxygen analyzer is equipped with an air inlet and an air outlet it is therefore advisable to fit small sealed storage container with a “closed loop” system for monitoring oxygen.

Close Loop Sampling Principle

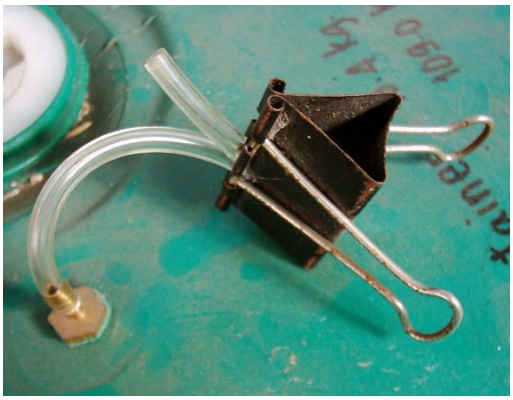
For oxygen sampling some of the air contained inside the container has to be sucked out and passed through the sampling apparatus consisting of an oxygen meter and several hoses or tubing. There is some dead air-space in the sampling device which means that a significant amount has to be pumped through the sampling device before a constant oxygen reading is obtained. This might disturb the atmosphere in small containers and might even create a small vacuum with the effect that the penetration of ambient air through the plastic material and the fittings for closing is increased.

Small storage systems should therefore be equipped with a “closed loop” system for oxygen sampling, meaning that after passing the oxygen meter the sampled air is returned into the storage container. Closed loop sampling requires:

- An oxygen meter that has an inlet and an outlet.
- Two fittings on the storage container for oxygen sampling.



Oxygen Sampling System for Plastic Drums

Simple system with outlet only. For installation: • Drill a hole in the drum • Use nut on the inside or cut a thread into the material if it is thick enough • Use silicone, Teflon tape or other sealants to seal the connection • Make sure that the hose is closed after sampling	
Plastic drum fitted with closed loop sampling device. • Drill a hole in the plastic drum • Cut a thread or if a thread cutter is not available drill a smaller hole and force the brass fittings (1/4 by 3/16) in the hole. Use Teflon tape to seal the thread • If the oxygen analyzer has inlet and outlet install closed loop system	
Closed loop system • For sampling connect one fitting to Oxygen analyzer inlet, the other one to the outlet. • After sampling close sampling fittings as shown on the right	

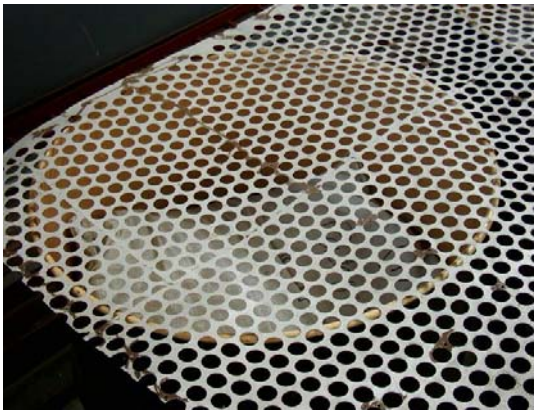
Oxygen Sampling System for Joseph Bags

Procedure for installing monitoring system in Joseph bags:

- Fill the sack with grains
- Insert two tubes from an IV set (left and right sides of the bag). Make sure that the tube is reaching far enough into the bag so that after sealing it will not be closed. Make also sure that the two tubes are long enough so that they can be both connected to the O2 analyzer
- Seal the bag with a hot iron (experiment with another (empty) bag first to make sure the temperature is right
- In addition some silicone or grease can be used to further seal the tube
- After oxygen sampling make sure that the tubes are closed properly

Protection of Reference Samples from Rodents and Birds

Reference sample put in open steel drums and..



… covered with perforated sheets

.. covered with wire mesh