

Measuring Relative Humidity in a Smokehouse

When making jerky under FSIS or state inspection, if you are using Appendix A as the justification for the safety of lethality step in your jerky process, then you will be required to monitor relative humidity in your smokehouse or oven.

If your oven does not have a wet-bulb probe in it, you can still monitor the relative humidity by either making your own wet-bulb probe or using a humidity gauge. The wet-bulb probe is considered more accurate and reliable over time than humidity gauges. You can make your own by draping either a commercially-made wet bulb sock (can buy from smokehouse or equipment companies) or a home made wet-bulb sock over a thermometer or thermocouple (see picture below). The material needed to make your own wet-bulb sock must be 100% cotton and can either be the material that is used to make the hand towel rolls (that you still see occasionally in restrooms), or (never used) cotton diaper material. The end of the sock needs to be submerged in water, so that the cotton material will wick up moisture to the probe. Your wet-bulb sock may need more space between the thermometer and the water than is shown in the picture below, to ensure that air is circulating properly around the probe.



A wet-bulb probe needs to be placed close to the exhaust damper, and so that air can pass over the wet sock as it leaves the oven. Most engineers agree that the air at the exhaust damper is most representative of the condition of the air in the oven.

As air blows over the wet sock, if the air is dry, it will dry the sock and cause the probe to read a colder temperature, due to evaporative cooling. If the air is humid (or if the cotton sock is not wicking water), there will be less evaporative cooling of the thermometer and the wet-bulb thermometer will read closer to the air temperature (without the wet sock). When you have a wet-bulb temperature and a dry-bulb temperature (air temperature of probe not covered with wet sock), you can then determine the % relative humidity by either using a slide rule (normally free from equipment suppliers) or relative humidity calculators that are available on the Internet (<http://home.fuse.net/clymer/water/wet.html>).

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