First Steps to Develop a Peanut Dryer Muffler to Meet OSHA Noise Requirements

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Peanut dryers when operating produce a very loud noise which prompted a request to engineers at the USDA-ARS National Peanut Research Laboratory (ARS-NPRL) to investigate if the noise level could be abated. Inquiries by ARS NPRL engineers led to a collaborative investigation between the engineers at the ARS NPRL and engineers of the Structural Acoustics Branch at the National Aeronautics and Space Administration Langley Research Center. The objective of the collaborative investigation was to determine if new tuned noise damping materials could be used to design an economical muffler to reduce noise levels of an operating peanut dryer to meet US Occupational Safety and Health Administration (OSHA) requirements.

The ARS NPRL engineers first conducted a series of tests to determine baseline noise levels of an operating peanut dryer without and with a muffler. The ARS NPRL engineers designed a muffler that would attach to either the inlet or outlet of a peanut dryer and could be lined with fiberglass batting. The series of tests were conducted using a Blue Line model 2407 peanut dryer with a 0.6m (24 in) fan. The tests were conducted with the peanut dryer connected to a peanut wagon filled with in-shell peanuts. The dryer and wagon were located in a drying shed with a metal roof, one side wall and a concrete slab floor. The first tests were conducted without a muffler to provide baseline noise levels that could be compared to noise levels of various muffler configurations. Noise levels were measured on a logarithmic scale in decibels (dBA).

The next tests were conducted with the peanut dryer attached to various muffler configurations. The five muffler configurations tested were:

1. The air intake of the peanut dryer was fitted with an empty unlined muffler.
2. The air intake of the peanut dryer was fitted with a muffler lined with fiberglass.
3. The air exhaust of the peanut dryer was fitted with a muffler lined with fiberglass.
4. The air intake and air exhaust of the peanut dryer were each fitted with a muffler lined with fiberglass.
5. The air intake of the peanut dryer was fitted with two inline mufflers lined with fiberglass.

Muffler test results indicated two inline mufflers with fiberglass linings fitted to the air intake of an operating peanut dryer provided the best noise suppression of the tested muffler configurations. Two inline mufflers reduced sound levels from 101.3 dBA without a muffler to 90 dBA at a distance of 4.5 m (14.7 ft) directly in front of the intake. The baseline data collected by the ARS NPRL engineers is being used by the engineers at the Langley Research Center to configure a muffler using tuned noise damping materials.