

374 – Farmstead Energy Improvement Specifications

In general, installation of an energy conservation improvement must be comprehensive across a building to be certified and qualify for the practice payment. For example, conversion of sidewall curtains to permanent walls must be done on both walls of a broiler house, not just the north wall. However, the following exemptions are made for poultry houses:

- Roll-up doors do not have to be installed at all vehicular door openings.
- Radiant heaters can be installed throughout the full house or throughout the brood chamber only.
- In consideration that most exhaust fans have minimal potential for energy improvement and lengthy payback periods (greater than 10 years), entire banks of exhaust fans do not have to be replaced. In fact, only those exhaust fans identified as inefficient by the energy audit shall be contracted for replacement.

Improvements must be consistent with the intent of relevant energy audit recommendations.

In keeping with longstanding NRCS policy, all improvements must be fully installed and functional before certification as complete.

Attic Insulation

This improvement provides for the *addition* of insulation providing R-15 *additional* thermal resistance. NRCS currently has no restrictions on the insulation type. A fresh-installed depth of 4.7 inches of blown-in cellulose is needed for R-15 thermal resistance. A depth of 6.1 inches is needed for R-15 using blown-in fiberglass.

Wall Insulation (FY2014)

This improvement provides for the addition of spray foam insulation or the replacement of deteriorated fiberglass batt insulation. Any deteriorated existing insulation must be removed. New insulation must receive physical protection as appropriate for location. *This improvement must not be used to insulate sidewall curtains or other flexible wall materials of an agricultural building.*

Insulation and protection options currently include the following:

- 1) polyurethane spray foam, addition of minimum of 1" thickness (R-7) of minimum 2 lb/cf density, and a form of a physical protective barrier where within bird reach (typically the lower 2 ft). The protective barrier must be:
 - a. polyurethane spray foam layer, minimum 1/8" thick of 10 lb/cf density, or
 - b. interior plywood or OSB sheathing

OR

- 2) fiberglass batts, 3.5" thick (R-11), along with a vapor barrier and a protective barrier of interior plywood or OSB sheathing; all three components must be new.

Other construction options must be pre-approved by a GS-11 or higher engineer.

Spray foam insulation must be applied by a professional contractor using materials approved for poultry production facilities. The type, quality of work, and quantity required prohibits the use of foam insulation merely from an aerosol can. Before application of the foam insulation, application areas must be reasonably cleaned with compressed air or mechanical means. While wire screen may remain in place, foam insulation must not be applied to sidewall curtains or other flexible wall materials.

Sidewall Renovation

The sidewall curtain or other flexible wall material must be removed. A permanent exterior siding must be installed across the former window opening. The siding must be new sheet metal, minimum thickness of 29 ga, or new material equivalent to the existing siding, and the new siding must be lapped with the old siding or sealed in an appropriate manner to prevent water intrusion.

The wall must be reinsulated from the top of the footing to the eave, and the insulation must receive appropriate physical protection. Insulation and protection options currently include the following:

- 1) polyurethane spray foam, minimum of 1" thickness (R-7) of minimum 2 lb/cf density, from top of footing to eave, and a form of a physical protective barrier within bird reach (typically the lower 2 ft). The protective barrier must be:
 - a. polyurethane spray foam layer, minimum 1/8" thick of 10 lb/cf density, or
 - b. interior plywood or OSB sheathing

OR

- 2) fiberglass batts, 3.5" thick (R-11), along with a vapor barrier and a protective barrier of interior plywood or OSB sheathing; all three components must be installed from the top of the footing to the eave.

Other construction options must be pre-approved by a GS-11 or higher engineer.

Spray foam insulation must be applied by a professional contractor using materials approved for poultry production facilities. The type, quality of work, and quantity required prohibits the use of foam insulation merely from an aerosol can. Before application of the foam insulation, application areas must be reasonably cleaned with compressed air or mechanical means. While wire screen may remain in place, foam insulation must not be applied to sidewall curtains or other flexible wall materials.

All areas of curtains or flexible walls, except those functioning as tunnel ventilation inlets, must be converted to permanent walls to complete this improvement as a comprehensive certifiable practice.

Sealant

This improvement is the interior-face sealing of the cracks and holes in the exterior walls of an existing agricultural building. The improvement is not intended to provide additional insulation on the flat planes of the building panels. Rather, the improvement must seal the cracks which exist at the linear junctions of the flat planes, cracks around fan and door frames, and miscellaneous holes and cracks in the flat planes of the building panels. In a poultry house with a dropped ceiling, the typical sealing lines are the junction of the exterior walls with the stem wall (or footing) and the junction of the ceiling with the endwalls. In a poultry house with open truss-work, the typical sealing lines are the ridge cap, gable ends, eaves, and the junction of exterior walls with the stem wall. Cracks in the concrete footing must be sealed but general insulating of the interior vertical face is not required.

A professional contractor must perform the sealing using a foam approved for production facilities of interest. The type, quality of work, and quantity required prohibits the use of foam sealant merely from an aerosol can. For poultry houses, sealant above bird access must be a minimum of 2 lbs/cf polyurethane or equivalent. Sealant within bird reach (typically 2 ft of floor) must be a minimum of 10 lbs/cf polyurethane or equivalent. Before application of the sealant, the lines or areas to be sealed must be reasonably cleaned with compressed air or mechanical means.

Roll-Up Door

Roll-up doors must provide a positive means of sealing against air leaks during cool-season ventilation. Roll-up doors must provide a thermal resistance of at least R3 (equivalent to the air films along three parallel sheets of building material separated by air gap).

LED Bulbs

Technology: Light-Emitting Diode (LED)

Socket Base: E26

Luminance: 400 lumens minimum at 100% output

Initial Efficacy: minimum of 50 lumens/Watt at 100% output

Output Angle Distribution: 115 to 160°

L70 Lumen Maintenance (useful life): 25,000 hours or greater

Dimming Range: 10 to 100% of output, *if installed as a poultry growout bulb*

Lens: Sealed lens or globe that protects circuitry from broiler litter airborne particulates and clean-up operations.

The producer is strongly encouraged to seek and purchase a model of LED bulb with a proven history for poultry house use.

CFL Bulbs

Technology: Compact Fluorescent (CFL) or Cold-Cathode Compact Fluorescent (CCFL)

Socket Base: E26

Luminance: 400 lumens minimum

Initial Efficacy: minimum of 50 lumens/Watt at 100% output

Lens: An integral sealed lens or globe to allow easy cleaning is recommended but not required.

CFL Bulbs may be used as 'brooding' bulbs but must not be installed as poultry 'growout' bulbs.

Linear Fluorescent

Bulb Technology: T8 or T5 linear fluorescent

Ballasting: The fixture must use an electronic ballast. Magnetic ballasts are specifically prohibited due to their known inefficiency.

Fixture Output: Each fixture must use one electronic ballast to drive a minimum of 8 feet total length of bulbs.

Other: The fixture must be permanently installed with 'hard' wiring. Switches or electronic controls must be installed.

Exhaust Fan

The new fan must be a model previously tested by the Bioenvironmental and Structural Systems Laboratory (BESS Lab [<http://www.bess.illinois.edu/>]) or the Air Movement and Control Association (ACMA [<http://www.amca.org/>]).

Fans for broiler houses must be "tunnel" fans and have an efficiency greater than 17 cfm/W at 0.05" static pressure. The fans must be functional, which necessarily requires that electrical wiring and controls are installed.

HAF (Circulation Fan)

Fans must be designed to function as circulation fans and for a poultry house environment. Fans cannot be exhaust fans, such as tunnel ventilation fans. The fans must be functional, which necessarily requires that electrical wiring and controls are installed.

Radiant Heater

Poultry Houses

The radiant heat capacity installed must be adequate for 99% of annual operating days. Conventional “pancake” brood heaters must be removed. Existing forced-air space heaters may remain for supplemental heating capacity for the 1% of extreme cold weather days. Radiant heaters may be radiant tubes, “radiant quads”, or radiant brooders.

The installed radiant heating capacity must meet the integrator’s requirements for capacity. Often, an integrator has two specifications: one for the brood end, and another for the non-brood end (or the house as a whole). If the integrator’s requirements cannot be obtained, then the installed capacity must meet the recommendations of the energy audit. The installed capacity is for Arkansas typically in the range of 35 to 45 BTU/hour per square foot of the whole house area (*this statement is for general guidance and is not a specification*).

Other Agricultural Buildings

Radiant heaters should generally be radiant tubes, “radiant quads”, or radiant brooders; however, other types of radiant heaters may be appropriate for other types of agricultural buildings. The radiant heating capacity requirements for other types of agricultural buildings must meet an integrator’s requirements, if applicable, or the recommendations of the energy audit. However, the installed capacity must be consistent with the norms for the type of agricultural building concerned.

Plate Cooler

The plate cooler must be stably mounted and functional. Plumbing to the cooler must be complete. Auxiliary components—such as piping from the water source and piping to an appropriate disposal point—must also be installed and functional.

Scroll Compressor

The compressor and control panel(s) must be stably mounted and functional. Wiring, breaker switches, etc. must be installed and functional.

Automatic Controller System

System controllers must integrate the operation of multiple sub-systems. These controlled sub-systems must be installed and functional. Wiring, breaker switches, etc. for the controller must be installed and functional. The controller panel(s) must be stably mounted and operate the associated sub-systems.

Variable Speed Drive

The associated electric motor and driven equipment must be installed and functional. Wiring, breaker switches, etc. for the motor and variable speed drive must be installed and functional. The controller panel(s) must be stably mounted and operate the attached electric motor and equipment.

Motor Upgrades

The driven equipment (pump, fan, etc.) must be installed and functional. The motor and control panel(s) must be stably mounted and functional. Wiring, breaker switches, etc. must be installed and functional.

All classes and horsepower of motors which have a defined NEMA Premium standard must meet the efficiency for NEMA Premium. See the NEH650-20 Energy supplement for more information.