FARMSTEAD ENERGY IMPROVEMENT
(All Enterprises except Maple Syrup and Nursery/Greenhouse)
CONSTRUCTION SPECIFICATION
(374)

1. SCOPE

The work shall consist of furnishing materials and installing selected components prescribed in an On-farm Energy Audit completed through a Conservation Activity Plan 122 and/or ASABE Standard S612 as outlined in this specification and the attached drawing and details.

2. EQUIPMENT AND MATERIALS

Equipment and materials installed shall match the type and size recommendations found in the On-farm Energy Audit. Changes require an approved revision by the audit TSP.

3. INSTALLATION

Installation shall conform to all applicable codes, laws and regulations.

Installation shall be a per drawings and manufactures' requirements.

All changes need prior approval.

Changes to audit recommendations must be obtained in writing by the landowner from the audit writer prior to approval and implementation.

Installation shall be by a qualified professional (Manufactures' Representatives, Equipment Companies, Ag Building Companies, Electricians, etc.)

Replacement of light bulb only, are normally done by the landowner.

4. SPECIFICATIONS

The following specifications supplement the information given on the drawings. The qualified professional that does the work shall meet the requirements applicable to their work and must also meet these specifications. Unlisted components shall meet the requirements specified in the Energy Audit.

CFL Bulbs

Technology: Compact Fluorescent (CFL) or Cold-Cathode Compact Fluorescent (CCFL) Socket Base: E26
Luminance: 400 lumens minimum
Efficacy: minimum of 50 lumens/Watt at 100% output
Dimming Range: 10 to 100% of output, *if installed as a growout bulb*
Output Angle Distribution: 120 to 160˚
Durability: 20,000 hours minimum
Other: Sealed lens that provides circuitry protection from both broiler litter airborne particulates and clean-up operations or wet environments such as a milkhouse or parlor area.

LED Bulbs

Technology: Light-Emitting Diode (LED) Socket Base: E26
Luminance: 400 lumens minimum at 100% output
Efficacy: minimum of 60 lumens/Watt at 100% output
Dimming Range: 10 to 100% of output, *if installed as a growout bulb*
Output Angle Distribution: 120 to 160˚
Durability: Must have verifiable independent testing that shows a durable life in excess of 30,000 hours in a poultry house environment.
Other: Sealed lens that provides circuitry protection from both broiler litter airborne particulates and clean-up operations or wet

environments such as a milkhouse or parlor area.

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. The fixture (with bulbs) must be ENERGY STAR qualified and bear the logo.

Pulse Start Metal Halide

Technology: Pulse Start Metal Halide

Base: Halogen approved that must contain all parts if bulb bursts

Luminance: Average or mean> 385 original

Distribution: 120 to 160˚

Durability: 12,000 hour or > durable life

Other: Sealed system against moisture. Location not installed in close proximity to paper, cloth or other combustible materials.

Ventilation-Exhaust Fans

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]).

Efficiency in cfm/W at 0.05" static pressure will vary with size of fan and must meet or exceed audit requirements as shown on drawings.

Fans shall be securely mounted and those located within 7 feet of a floor shall have a protective cage on both sides and/or louver combination.

Plate Cooler

The plate cooler must be securely 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.

Variable Speed Drive

The associated electric motor (can be a separate item if existing motor was not 3-phase) and drive equipment must be installed and functional. Wiring, breaker switches, etc. for the motor and variable speed drive must be installed and functional. Use shielded wire between the controller and motor. The controller panel(s) and 3-phase inverter must be securely mounted and operate the attached electric motor and equipment.

Automatic Controller System

System controllers must operate multiple components or sub-systems. These controlled components or 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 securely mounted and operate the associated components or sub-systems.

Radiant Heaters (Radiant Tubes)

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.

Motor Upgrades (Electric)

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

The horsepower and phase of the motor shall be shown on the drawings.

Attic Insulation

This improvement provides for the *addition* of insulation to achieve the R thermal resistance specified in the audit. Existing insulation can be used to achieve the required final depth.
In all cases a minimum settled depth of 4 inches (R-15) of existing and new blown-in cellulose is required.

Wall Insulation

The sidewall curtain or other flexible wall material must be removed. A permanent exterior siding must be installed across the former window opening. The new siding must be sheet metal or 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 from animal access. Insulation and protection options currently include the following:

1) 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 installed from the top of the footing to the eave.

OR

2) Fiberglass batts, 3.5" thick (R-11), along with a vapor barrier and a protective barrier of interior plywood or OSB sheathing or a combination of the lower 4 feet with plywood or OSB and a woven PE fabric (Tri-poly Canvex or equal) to the top of the eave.

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 installation.

Meet these requirements, unless drawings show additional insulation requirements or alternatives.

Attic Heat Recovery Vents

These manufactured vents or inlets allow dry warm air form the attic to be circulated throughout the building. Each vent is wired for remote opening and closure. Control system integrated with building environmental system. The concept and number of vents must be approved by integrator. Vents to fully seal when closed.

Sealant

This improvement is the interior-face sealing of agricultural building. The improvement is not intended to provide additional insulation on the flat planes of the existing building panels. The improvement must seal the cracks which exist at the linear junctions of the flat planes and to seal miscellaneous holes. In a poultry house with a dropped ceiling, the typical sealing lines are the junction of the exterior walls with the footer plate 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.
The sealing must be performed by a qualified professional using sealant approved by poultry production facilities integrator. The type, quality of work, quantity required prohibits the use of foam sealant from an aerosol can. Sealant above bird reach (typically 2') must be a minimum of 10 lbs.cf polyurethane or equivalent. Before application of the sealant, the lines or areas must be reasonably cleaned with compressed air or mechanical means.

Grain Dryer

The dryer and control panel(s) must be stably positioned and functional. Wiring, breaker switches, etc. must be installed and functional. Support systems shall meet the manufactures requirements.

Tunnel Door
Replace existing tunnel inlet curtain with solid door. Typical installation is 5 ft. high by 30 ft. long.

5. SAFETY

Electrical wiring shall be installed to meet national, state, or local electrical code, whichever is more restrictive. The work must be done by a qualified professional. Existing services requiring upgraded or extension shall be done at owner's expense.

Equipment shall be installed with all required safety shields and warning signs.

Components exposed to humid or wet conditions shall have additional moisture protection.

Components with liquid systems shall be protected from freezing or means to drain the liquids for winterization.

6. SUBMITTALS

The producer shall provide invoices that verify the type, material, or size of component being installed. This can include manufactures literature.

The producer must provide a copy of approved revisions to the drawings.

The producer shall provide verification that modifications for facility are approved by integrator, if applicable.

The producer shall provide a certification from the qualified professional(s) that the installation was installed as per manufacture's requirements.

Qualified professional includes Manufactures Representatives, Equipment Companies, Ag Building Companies, Electricians, etc.

Producer self-installation, other than changing light bulbs requires qualified profession sign-off.

7. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE: