NOTES: These drawings are not complete building plans – rather, their intent is to show concepts, select design recommendations and application differences based on recent USDA research and field experiences. These drawings in turn can be used in preparation of more complete, individually engineered designs. Consult a registered engineer to prepare your plan.

General Design:
1. Foundation design is from USDA calculation. A soil bearing capacity of 2000 lbs./ft. was used with a concentrated truck wheel load of 4500 lbs.
2. Potato spud weight of 14 lbs. per cubic foot (20 lbs./cu. ft.)
3. Clean, wet, smooth-skinned, round potatoes (e.g. Norlands) that exert a horizontal wall pressure of 0.05 Equivalent Fluid Density of 15 lbs. per cubic foot.
4. Maximum potato depth of 12 ft. with binwall stud height of 9 ft. on a 1 ft. high foundation.
5. Lumber bending stress (Fb) of 1725 psi was more critical than horizontal shear stress (Fh) of 95 psi for rafter. The allowable compression stress used was 825 psi perpendicular to grain.
6. Lumber design allowable stresses were not adjusted for moisture or temperature as permitted by the 1980 National Design Specifications.
7. No special design conditions were used for snow or wind loads. The design snow load was 25 lbs. per sq. ft. of roof.
8. Vapor barriers must be correctly installed (no insulation stays dry) sealed along edges with nailed and taped joints.

Ventilation Design:
1. Ventilation duct airflow of 1 cu. ft. per minute per CWT (1 CFM/CWT).
2. Vent duct maximum speed of 1000 feet per minute (17 mph).
3. "Through" type ventilation with 10% the needed airflow for potatoes along each side-wall and 1/2 through the binwall door at the bin. Extra duct capacity is required for well venting the single-wall designs.
4. Single-wall intake air ventilation rate of 1 cu. ft. per minute per sq. ft. of wall surface with air inlet regulated by restriction at top vent wall opening.
5. At vent duct transitions, a downstream duct cross-section area of 0.75 to 0.87 minimum of upstream cross-section duct area.
6. A 1/2 approximation of area of green duct cross-section area to air inlet slot area or an effective slot area to duct cross-section area of 0.51.
7. Experience is limited with the plywood-covered interior ducts. Under extreme conditions with extremely small potatoes and very large drums a center slot in the plywood may be needed to let some air through - then design for 3 slots instead of 2.
8. See USDA Circular AE-90, "Potato Storage Ventilation" for air heating design recommendations or the latest up to date publication.

POTATO STORAGE - 65,000 CWT SINGLE EXTERIOR WALL: Intended for use with more detailed planning, these drawings show the major construction and ventilation features for a 80' x 172' building with 8 storage bins and a cross-alley work area. These major features change with changes in storage size. Two other sets of drawings are available for storage capacities of 88,000 CWT single exterior wall 88' x 204' and for 88,000 CWT double exterior wall 88' x 204'.
Ventilation Design:

1. Ventilation duct airflow of 1 cu. ft. per minute per CWT (1 CFM/CWT).
2. Vent duct maximum speed of 1500 feet per minute (17 mpg).
3. "Through" type ventilation with 1/4 the needed airflow for potatoes along each sidewall and through the bottom-center of the bin. Extra duct capacity is required for wall venting of single-wall designs.
4. Single-wall inside shall ventilation rates of 1 sq. ft. per minute per sq. ft. of wall surface with airflow regulated by restriction at top and vent opening.
5. At vent duct transitions, a downstream duct cross-section area of 0.75 to 0.87 minimum of upstream cross-section duct area.
6. A 1:9 approximate ratio of gross duct cross-section area to air slot area or an effective slot area to duct cross-section area of 0.81.
7. Experience is limited with the plywood-covered heater ducts. Under extreme conditions of wet, moidly, small potatoes and very large ducts a center slot in the plywood may be needed to let some air through - then design for 5 slots instead of 2.
8. See USDA Circular AE-89, "Potato Storage Ventilation," for air handling design recommendations or the most up-to-date publication.

NOTE: Changing dimensions of potato bin will change ventilation requirements.
NOTE: Proper slot sizes are critical to provide uniform air distribution.

NOTE: Changing dimensions of potato bin will change ventilation requirements.