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**GOOD AGRICULTURAL PRACTICES**

**FOR**

**BUYING POINT OPERATIONS**

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## A. PROCESS DESCRIPTION

The buying point is the first point of sale where peanuts transfer from the grower to the sheller, or the shellers agent. Buying point practices usually include curing, grading, and preparation for transport to either storage or the shelling plant. Some buying points may clean and store farmer stock peanuts. Buying points may also offer agronomic consulting services, educational meetings on quality, production, and marketing. Execution of good management practices for the buying point is essential to maintain or enhance the quality, flavor potential and shelling characteristics of peanuts delivered by the grower. The following good management practices for buying point operation include personnel training and conduct, and maintenance and operation of facilities, curing and handling equipment, grading, cleaning, and transportation.

## B. CRITICAL AREAS

### 1. Personnel

The operations conducted at the buying point, especially curing, are crucial to maintaining the quality of the product delivered by the grower. Therefore, personnel should be trained in all tasks that they may be assigned. Make sure they know the importance of their duties. Conduct periodic checks of each person's ability to follow instructions. Make personal safety equipment, such as hearing protection (disposable ear plugs or ear muffs), dust masks, and possibly hard hats, available and enforce their use. All dryer operators and other personnel when near the dryers should wear hearing protection due to the loud, high frequency noise produced by the fans. Dust masks should be used in dusty environments such as around the dump pits, elevators, and cleaners. Personnel should have safety training, and routine safety inspections should be conducted for all equipment.

### 2. Facilities

The buying point facility should promote the production and storage of a clean food product. The area should be well drained, paved or kept graded to prevent collection of water. Gravel should be applied to unpaved surfaces to reduce dust. Before arrival of farmer stock peanuts, the buying point manager should ensure the following:

- Clean all buildings, grounds, shelters, pits, sampling areas and equipment of old peanuts, foreign material, glass, and other potential sources of contamination of the new crop. **Glass containers of any kind should not be permitted on the facility.**
- Clean drying trailers of old peanuts, grains, dirt and all other foreign material. Clean trailer plenums with high-pressure washers and compressed air; ensure trailers are thoroughly dry before use. Conduct preventive maintenance to control rust, loose paint, loose fasteners and metal fragmentation that may contaminate peanuts. Check tires for general condition and proper inflation. Obtain spare tires for peanut trailers prior to harvest. Lubricate wheel bearings, tighten lug nuts to proper tension, and check lights for proper operation. Trailers should be equipped with the Slow Moving Vehicle (SMV) sign. During the harvest all damaged or contaminated peanuts should be cleaned up regularly from yard and storage areas.

- Examine and ensure efficient drying equipment operation by checking burner function, gas flow, airflow capacity (manufacturers' specifications), thermostat accuracy, and humidistat accuracy. The thermostat should make/break the circuit within 4°F of the air temperature. The difference in temperature when the thermostat switches off (example - 95°F) and the temperature when it turns back on (example 92°F) should be no more than 8°F. Thermostats can generally not be repaired or adjusted. Therefore, replace thermostats when they no longer perform within specifications.
- Inspect and repair dryer plenums, air ducts, dryer connectors, control gates and transition sections to prevent air leaks.
- Inspect and repair drying shed roofs to prevent moisture leaks. Remove potential foreign material within the structure such as bird and wasp nests.
- Thoroughly clean the dump pit of foreign materials and water. Insure that trailer lifts are in safe, operational condition.
- Inspect the condition, speed and efficiency of operation of elevators and conveyors. Thoroughly clean elevator buckets, boots and other surfaces used in the handling of peanuts. Belt speed for *horizontal or inclined* conveyors should not exceed 200 fpm. Acceptable maximum belt speeds for elevators depend on the diameter of the head pulley (*See Table 1*).
- Calibrate scales.
- Ensure that all sampling equipment required by the FSIS is in proper working condition (*See "Farmer Stock Peanut Inspection Instructions," USDA, 2003*).

### 3. Curing

Mechanical curing offers advantages over windrow curing because it provides a controlled curing environment and reduces the risk of damage due to adverse weather conditions in the windrow. With this method, peanuts are allowed to remain in the windrow 2 to 5 days after digging to moisture contents ranging from 20 to 15%. Peanuts at these moisture levels sustain less mechanical damage during combining and subsequent handling, than when they are very green or very dry. Excessive drying times are required to cure peanuts with initial moisture contents greater than 20%, and may cause a backup at the drying facility. Even when cured properly, peanuts combined at moisture contents greater than 25% are subject to more split kernels and skin slippage. Encourage producers to dig peanuts at optimum maturity, then combine, weather permitting, after adequate windrow curing at peanut moisture contents no higher than approximately 20% moisture, wet basis, using optimum combine settings to minimize foreign material (FM), loose shelled kernels (LSK), and cracked or broken pods.

Select the proper dryer unit for the trailer or trailer combination. Consult the manufacturer's specification for airflow, and size the dryer units to obtain a minimum of 12.5 to 15 cu ft/min (cfm) per cubic foot of peanuts in the drying trailer. Consider for example, a dryer rated for 10,500 cfm at 1-inch static pressure. The actual air delivered would be 5-10% less or approximately 9,450 cfm, since manufacturer's airflow ratings are specified for fans without burners. This dryer could supply 19.4 cfm/cu ft for a 14-ft (488 cu ft) trailer, 12.9 cfm/cu ft for a 21-ft (732 cu ft) trailer, and 9.7 cfm/cu ft for a 28-ft (977 cu ft) trailer. Thus the dryer is adequate for 14- and 21-ft trailers, but undersized for a 28-ft trailer. (*See Table 4 for minimum airflow requirement for various trailers or trailer combinations.*)

Assure efficient identification and handling of loaded trailers to avoid trailer or vehicle build-up at the facility and delays in curing. The depth of peanuts in the standard curing bin/trailer should be no more than five feet. For each 5 percent of moisture above 25 percent, reduce the depth of the peanuts in the bin by one foot. In semi-trailers, the depth of peanuts should be no more than eight feet and moisture should be 25% or less. Airflow for both standard peanut trailers and semi-trailers should be between 12.5 and 15 cubic feet per minute for each cubic foot of peanuts in the curing bin. This will assure that curing in semi-trailers will be comparable to that for standard peanut trailers. It is also important to distribute the peanuts evenly within the curing bin for uniform airflow and curing. These guidelines allow the entire mass of peanuts to begin curing within 18 to 24 hours.

Hopper bottom semi drying trailers are designed to dry peanuts in thin layers. Generally all peanuts are within 3 feet or less from the source of the drying air throughout the trailer. Trailers are equipped with dampers to regulate drying between top and bottom of the load. Start with the dampers open so that the dry air reaches the top and bottom of the wet peanuts in the initial heat-up period. After the initial heat-up period, close the dampers for more efficient use of the drying air.

Apply natural or heated air within a few hours of combining to prevent hot spots and growth of bacteria and fungi. Control (minimize) temperature during curing to ensure high flavor quality and low split kernel out-turns in shelling. Ambient air temperature and relative humidity influence maximum thermostat settings and desired degree temperature rise above ambient. The rate of moisture removal can be controlled by regulating the temperature-rise above ambient. High temperature and low relative humidity will cure peanuts too rapidly and may result in over curing. Under no circumstances should the thermostat be set above 95°F. Temperature rise above ambient should be no more than 15 - 20°F. Curing temperature rise above ambient can be regulated by burner orifice size and gas pressure. If the orifice/gas pressure method is not used in conjunction with a thermostat to limit the temperature rise, the thermostat can be set to closely approximate the optimum curing condition based on minimum daily temperature. Temperatures in the trailer plenum should be checked at least as frequently as the moisture content (*See Table 2*). Be alert for cold fronts and reset thermostat so that a 20 degree F rise is not exceeded.

The thermostat location is crucial to accurate temperature control. Attach the thermostat permanently in the plenum transition at the location that best senses the temperature cycling for the dryer. This is usually on the transition vertical support member or at a location just to the right of the center. Measure plenum temperature by drilling a small hole in the trailer plenum opposite the heated air entry and insert a stem thermometer. Infrared (IR) thermometer "guns" may be used to check the curing trailer's external temperature, but remember, IR guns measure only the temperature of the surface at which they are aimed.

To set the temperature rise using the burner orifice/gas pressure method, set the thermostat at the highest temperature setting so that the burner will stay on and not cycle. Measure the temperature in the trailer plenum at the end or side away from the dryer, and adjust the gas pressure) to achieve the desired temperature rise above the ambient (usually 15 to 20 degrees F). Check the temperature in more than one location as the plenum temperature may vary. When the desired temperature rise is obtained, tighten the lock nut on the gas pressure regulator. The burner will run continuously and maintain the desired temperature rise regardless of ambient temperature. Reset the thermostat to 95°F, and the thermostat will serve as a high limit switch, limiting the maximum temperature in the plenum to 95°F. Control of temperature rise may also be accomplished with microprocessor-based dryer rate controllers. These controllers sense the temperature and relative humidity of the incoming air and adjust the temperature rise according to prescribed algorithms.

All moisture samples should be taken with a probe from several locations in the trailer or bin and represent all depths in the trailer. Note that a single sample taken at the top front of a rear-air-entry trailer may be slightly drier than the average of the load. The sample should be at least 250-300 g to obtain 200-250 g of kernels. Kernel moisture should be determined with a moisture meter, the

accuracy of which has been verified by the manufacturer or the Federal State Inspection Service (FSIS).

After curing, the distribution of kernel moisture contents should be determined using a single kernel moisture meter. Those lots having a wide variation in moisture contents may be segregated and/or shelled immediately to prevent the potential loss by molding in storage.

Initial moisture of each load should be checked and sampling frequency should be adequate to prevent over drying. Sampling frequency should be determined according to the moisture content of the load of peanuts, with frequency increasing as the peanuts approach the desired cutoff. Mechanical curing should end at approximately 10.5-11% to result in final kernel moisture content of 9-10% by residual curing. *Table 3* shows a range of curing times for various moisture content peanuts, with the shorter time for clean, mature peanuts being cured during a period of cool, dry conditions. Curing time will increase if the peanuts are deeper than the recommended 5 ft., have high moisture foreign material, are immature, or weather conditions are warm and humid.

After curing, protect peanuts from rain and other contamination throughout grading and unloading. Do not cover peanuts with plastic or canvas covers, unless rain is imminent and no other suitable shelter is available.

Pay close attention to trailer maintenance throughout the drying season. Periodically clean build-up of dirt and debris from plenums. Reduce foreign material going into the warehouse when dumping from rear-air-entry trailers by clamping a piece of plywood across the air inlet.

#### 4. Grading

The Fresh Products Branch of the U.S. Department of Agriculture's Agricultural Marketing Service administers the peanut grading program and publishes the Farmer Stock Peanut Inspection Instructions (last revised 2003). These instructions are used by Federal State Inspection Service (FSIS) personnel to grade peanuts. Equipment used in grading farmer stock peanuts should be examined and repaired as needed to assure proper operation. FSIS personnel should note the presence of adverse quality characteristics on the official note sheet and notify buying point management personnel of those characteristics. Items that should be noted include the presence of high moisture foreign material, offensive odors, high percentages of bald kernels, foreign material (FM), and loose-shelled kernels (LSK), and uncharacteristically low grades.

#### 5. Cleaning

CCC or PAC regulations require cleaning all farmer stock peanuts with 10% or greater foreign material. However, cleaning all peanuts before storage will improve quality because the removal of LSK, high moisture foreign material and dirt reduces the risk of insect and fungus damage in storage.

- Farmer stock peanuts with excessive troublesome foreign material (>4% suggested), such as gherkins, citron pieces, etc., or excessive LSK (>5% suggested) should be cleaned.
- Cleaning equipment may be sand screens, belt screens or other cleaners capable of removing the wide range of foreign material occurring in farmer stock peanuts.

6. Handling

- Avoid excessive handling, belt speeds and drops through conveyors and elevators to minimize damaging the farmer stock. *Horizontal* or *inclined* belt conveyors should not exceed 200 fpm. Maximum speed for bucket elevators depends on the diameter of the head pulley (*See Table 1*). Handling should drop peanuts less than 8 ft. to reduce cracked and broken pods and LSK.
- Maintain discipline at dump pit to insure that foreign materials, such as glass, do not fall into the pit. Prevent dirt and other foreign material in trailers from being dumped into the pits.

## Buying Point Checklist

### **Personnel Training**

- Emphasize critical nature of job
- Personal safety equipment
  - hearing protection
  - eye protection
  - dust masks
- Safety procedures
  - tractor
  - conveyors
  - cleaners
  - first aid
  - inspectors
- Proper curing methods
  - sampling
  - moisture measurement
  - dryer controls
  - 15-20°F above ambient
  - no higher than 95°F

### **Pre-season Preparation**

- Clean all handling equipment
  - belt conveyors
  - cleaners
  - hoppers
  - dump pit(s)
  - drying trailers/bins
  - grading equipment
- Check equipment operation
  - conveyor and elevator speeds
  - dryer fan
  - burner control circuit components
  - dryer thermostat
  - pneumatic sampler
  - grading equipment
  - truck scales
  - lifts

- Obtain spare parts
  - spare trailer tires
  - elevator and conveyor bearings
  - dryer components
    - ♦ ducts
    - ♦ thermostats
    - ♦ flame probes
    - ♦ gas regulators
    - ♦ gas solenoids
    - ♦ spark plugs
    - ♦ spark transformers

### **Harvest Operations**

- Encourage harvesting mature crop
- Encourage windrow curing (partially)
- Sample trailers according to moisture content and expected drying time
- Allow moisture content to equilibrate after mechanical curing prior to grading (~ 4h)
- Clean damaged contaminated peanuts from yard and storage areas

### **Post-Season Operations**

- Clean all handling equipment
- Clean peanut trailers
- Repair all equipment
- Repair shelters
- Clean up yard

**Table 1.** Maximum belt velocity recommended for farmer stock peanut elevators (Smith, J.S., Jr., Considerations for farmer stock peanut warehouses, National Peanut Council, Alexandria, Virginia, 1994).

<b>Head Pulley Diameter, inches</b>	<b>Head Pulley RPM</b>	<b>Belt Velocity feet/minute</b>
8	96	201
10	82	215
12	73	228
14	66	241
16	60	252
18	56	264
20	52	274
22	49	285
24	47	295
26	45	304
28	43	314
30	41	323
32	40	332
34	38	340
36	37	349

**Table 2.** Recommended thermostat settings for peanut dryers without burner orifices to limit the temperature rise to 15°F above ambient.

<b>Daily Minimum Temperature °F</b>	<b>Thermostat Setting °F</b>
less than 60	70
60	75
70	85
80	95
90	95

Taken from Figure 11, “Chapter 12: Harvesting, curing, and energy utilization,” in *Peanut Science and Technology*, assuming that relative humidity is between 60 and 90 percent when the daily minimum temperature occurs.

**Table 3.** Approximate drying times for a typical load of peanuts with adequate airflow and less than 5 feet deep.

<b>Peanut Moisture Content %</b>	<b>Drying Time H</b>
30	40 to 64
25	30 to 48
20	28 to 36
17	20 to 28
15	12 to 18
13	8 to 13

**Table 4.** Minimum airflow requirements for various trailer combinations.

Manufacturer's Airflow Rating	Manufacturer's Airflow less 10% for burner <sup>2</sup>	CFM per Cubic Foot of Peanuts for Various Trailer Sizes <sup>1</sup>						
		One 14-ft (488 ft <sup>3</sup> ) <sup>3</sup>	One 21-ft (732 ft <sup>3</sup> )	One 28-ft (977 ft <sup>3</sup> )	Two 14-ft (977 ft <sup>3</sup> )	Two 21-ft (1465 ft <sup>3</sup> )	Two 28-ft (1953 ft <sup>3</sup> )	45-ft Semi (2616 ft <sup>3</sup> )
		cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>
9,000	8,100	16.6	11.1	8.3	8.3	5.5	4.1	3.1
9,500	8,550	17.5	11.7	8.8	8.8	5.8	4.4	3.3
10,000	9,000	18.4	12.3	9.2	9.2	6.1	4.6	3.4
10,500	9,450	19.4	12.9	9.7	9.7	6.5	4.8	3.6
11,000	9,900	20.3	13.5	10.1	10.1	6.8	5.1	3.8
11,500	10,350	21.2	14.1	10.6	10.6	7.1	5.3	4.0
12,000	10,800	22.1	14.7	11.1	11.1	7.4	5.5	4.1
12,500	11,250	23.0	15.4	11.5	11.5	7.7	5.8	4.3
13,000	11,700	24.0	16.0	12.0	12.0	8.0	6.0	4.5
13,500	12,150	24.9	16.6	12.4	12.4	8.3	6.2	4.6
14,000	12,600	25.8	17.2	12.9	12.9	8.6	6.5	4.8
14,500	13,050	26.7	17.8	13.4	13.4	8.9	6.7	5.0
15,000	13,500	27.6	18.4	13.8	13.8	9.2	6.9	5.2
15,500	13,950	28.6	19.0	14.3	14.3	9.5	7.1	5.3
16,000	14,400	29.5	19.7	14.7	14.7	9.8	7.4	5.5
16,500	14,850	30.4	20.3	15.2	15.2	10.1	7.6	5.7
17,000	15,300	31.3	20.9	15.7	15.7	10.4	7.8	5.8
17,500	15,750	32.3	21.5	16.1	16.1	10.8	8.1	6.0
18,000	16,200	33.2	22.1	16.6	16.6	11.1	8.3	6.2
18,500	16,650	34.1	22.7	17.1	17.1	11.4	8.5	6.4
19,000	17,100	35.0	23.3	17.5	17.5	11.7	8.8	6.5
19,500	17,550	35.9	24.0	18.0	18.0	12.0	9.0	6.7
20,000	18,000	36.9	24.6	18.4	18.4	12.3	9.2	6.9
20,500	18,450	37.8	25.2	18.9	18.9	12.6	9.4	7.1
21,000	18,900	38.7	25.8	19.4	19.4	12.9	9.7	7.2
21,500	19,350	39.6	26.4	19.8	19.8	13.2	9.9	7.4
22,000	19,800	40.6	27.0	20.3	20.3	13.5	10.1	7.6
22,500	20,250	41.5	27.6	20.7	20.7	13.8	10.4	7.7
23,000	20,700	42.4	28.3	21.2	21.2	14.1	10.6	7.9
23,500	21,150	43.3	28.9	21.7	21.7	14.4	10.8	8.1
24,000	21,600	44.2	29.5	22.1	22.1	14.7	11.1	8.3
24,500	22,050	45.2	30.1	22.6	22.6	15.1	11.3	8.4
25,000	22,500	46.1	30.7	23.0	23.0	15.4	11.5	8.6
25,500	22,950	47.0	31.3	23.5	23.5	15.7	11.8	8.8
26,000	23,400	47.9	32.0	24.0	24.0	16.0	12.0	8.9
26,500	23,850	48.8	32.6	24.4	24.4	16.3	12.2	9.1
27,000	24,300	49.8	33.2	24.9	24.9	16.6	12.4	9.3
27,500	24,750	50.7	33.8	25.3	25.3	16.9	12.7	9.5
28,000	25,200	51.6	34.4	25.8	25.8	17.2	12.9	9.6
28,500	25,650	52.5	35.0	26.3	26.3	17.5	13.1	9.8

**Table 4.** Minimum airflow requirements, continued.

Manufacturer's Airflow Rating	Manufacturer's Airflow less 10% for burner <sup>2</sup>	CFM per Cubic Foot of Peanuts for Various Trailer Sizes <sup>1</sup>						
		One 14-ft (488 ft <sup>3</sup> ) <sup>3</sup>	One 21-ft (732 ft <sup>3</sup> ) <sup>3</sup>	One 28-ft (977 ft <sup>3</sup> ) <sup>3</sup>	Two 14-ft (977 ft <sup>3</sup> ) <sup>3</sup>	Two 21-ft (1465 ft <sup>3</sup> ) <sup>3</sup>	Two 28-ft (1953 ft <sup>3</sup> ) <sup>3</sup>	45-ft Semi (2616 ft <sup>3</sup> ) <sup>3</sup>
		cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>	cfm/ft <sup>3</sup>
29,000	26,100	53.5	35.6	26.7	26.7	17.8	13.4	10.0
29,500	26,550	54.4	36.3	27.2	27.2	18.1	13.6	10.2
30,000	27,000	55.3	36.9	27.6	27.6	18.4	13.8	10.3
30,500	27,450	56.2	37.5	28.1	28.1	18.7	14.1	10.5
31,000	27,900	57.1	38.1	28.6	28.6	19.0	14.3	10.7
31,500	28,350	58.1	38.7	29.0	29.0	19.4	14.5	10.8
32,000	28,800	59.0	39.3	29.5	29.5	19.7	14.7	11.0
32,500	29,250	59.9	39.9	30.0	30.0	20.0	15.0	11.2
33,000	29,700	60.8	40.6	30.4	30.4	20.3	15.2	11.4
33,500	30,150	61.8	41.2	30.9	30.9	20.6	15.4	11.5
34,000	30,600	62.7	41.8	31.3	31.3	20.9	15.7	11.7
34,500	31,050	63.6	42.4	31.8	31.8	21.2	15.9	11.9
35,000	31,500	64.5	43.0	32.3	32.3	21.5	16.1	12.0
35,500	31,950	65.4	43.6	32.7	32.7	21.8	16.4	12.2
36,000	32,400	66.4	44.2	33.2	33.2	22.1	16.6	12.4
36,500	32,850	67.3	44.9	33.6	33.6	22.4	16.8	12.6
37,000	33,300	68.2	45.5	34.1	34.1	22.7	17.1	12.7
37,500	33,750	69.1	46.1	34.6	34.6	23.0	17.3	12.9
38,000	34,200	70.0	46.7	35.0	35.0	23.3	17.5	13.1
38,500	34,650	71.0	47.3	35.5	35.5	23.7	17.7	13.2
39,000	35,100	71.9	47.9	35.9	35.9	24.0	18.0	13.4
39,500	35,550	72.8	48.5	36.4	36.4	24.3	18.2	13.6
40,000	36,000	73.7	49.2	36.9	36.9	24.6	18.4	13.8
40,500	36,450	74.7	49.8	37.3	37.3	24.9	18.7	13.9
41,000	36,900	75.6	50.4	37.8	37.8	25.2	18.9	14.1
41,500	37,350	76.5	51.0	38.2	38.2	25.5	19.1	14.3
42,000	37,800	77.4	51.6	38.7	38.7	25.8	19.4	14.5

<sup>1</sup> Airflow should range from 12.5 to 15 cfm per cu ft of peanuts. Air flow less than 10 cfm/ft<sup>3</sup> is inadequate, while airflow exceeding 15 cfm/ft<sup>3</sup> results in excessive fuel and power use.

<sup>2</sup> Manufacturer's airflow ratings are for fans WITHOUT burners. Airflow rating with burner will be 5-10% less.

<sup>3</sup> Volume based on peanut depth of 4' - 6" for 14-ft to 28-ft trailers and 7' - 6" for semi-trailers.

<sup>4</sup> Ratings for semi-trailers are in cfm per cubic foot @ 2-in static pressure (S.P.).