



Dryer Certification Manual

This manual is provided to you because you have submitted an application indicating interest in dehydrating fruit that will be marketed under the SunSweet brand. The information in this manual, once implemented, will become a path to the highest quality end product that SunSweet will be able to claim as unique to their products. In this highly competitive global environment, raising the quality standard is one way to maintain a competitive advantage over the generic competition. This manual contains several sections, each designed to provide background information explaining why these standards are important. Each section also contains pertinent information regarding minimum acceptable standards as well as additional treatments that further enhance product quality. As a dehydrator operator, you will be charged with maintaining the minimum requirement in each area in order to keep a current certification to dry SunSweet products. If you fail a SunSweet audit inspection, you will have a short window of opportunity to correct the noted deficiencies in order to keep your certification. Failure to correct those deficiencies will cause the rejection of fruit dried at your facility, as well as loss of certification for that calendar year. You will find that the requirements contained in the manual are straightforward and all lead to higher quality products, greater food safety, less potential contamination, a traceable path to the source, and greater consumer confidence.

Please take the time to thoroughly read and understand the contents of this manual. Once you have an understanding of the standards, please move with the utmost speed to adopt the recommended minimums in each area. Audit inspections of drying facilities will commence with the beginning of the 2004 harvest and you should be prepared for the SunSweet audit team. You should keep this manual as part of your permanent resource material so that you can refer to it when necessary and review it prior to the start of each harvest. Please note this manual does not supercede existing federal or state regulations. SunSweet's Field staff and Quality Assurance personnel are available to answer your questions regarding the certification standards. Please call your Field Representative if you have questions about this program.

We would like to acknowledge the information provided by the DFA of California and Prune Marketing Committee in the creation of this manual.

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Good Manufacturing Practices

Good Manufacturing Practice regulations (GMPs) are used by food manufacturers as they produce and test products that people consume. In the United States, the U.S. Food and Drug Administration (FDA) has issued these regulations as the *minimum requirements* to which manufacturers must adhere in order to ensure a modicum of food safety and manufacturing responsibility. In accordance with the Code of Federal Regulations, Title 21, Volume 2, Chapter 1, Part 110, Section 19a, *Exclusions*, as revised April 1, 1999, dehydrating facilities are NOT exempt from these regulations as the processes performed include cleaning, drying, and storing of processed commodities. As the products are further processed prior to distribution to the general public, Sunsweet suggests incorporating a modified current Good Manufacturing Practice (cGMP) policy into Dehydrator Standard Operating Procedures for the 2004 crop year. This modified program should include, at *minimum*, proper health, sanitation, personal property, and personal hygiene policies as defined below. A more comprehensive program which includes the additional recommendations is encouraged and may be implemented at the Dryer Manager's discretion.

Minimum standards

Health – 1) Any person who, by medical examination or supervisory observation, is shown to have, or appears to have an illness; open lesion including boils, sores, or infected wounds; or any other abnormal source of microbial contamination by which there is a reasonable possibility of food, food-contact surfaces, or food-storage materials becoming contaminated, shall be excluded from any operations which may be expected to result in such contamination until the condition is corrected. Personnel shall be instructed to report such health conditions to their supervisors. 2) *Gloves* are required whenever the employee has a non-infectious cut or wound. All cuts/wounds must be properly covered before putting on gloves or other designated protective gear. Remember, whatever can contaminate a human hand can also contaminate a disposable glove. Therefore, whenever hands should be washed, a new pair of disposable gloves should be worn. Never reuse or wash disposable gloves.

Personal Hygiene – 1) *Caps or bandannas* should be worn on the head at all times. 2) Facial hair is to be neatly trimmed and not exceptionally bushy. 3) Personal habits such as routine bathing and keeping fingernails short and clean are to be strictly maintained. 4) Always wash hands after each visit to the lunchroom or restroom; after touching human body parts; after coughing or sneezing, using a handkerchief or tissue, using tobacco, eating, or drinking; and after engaging in any activities that may contaminate hands (fixing machinery, handling chemicals, picking up dropped items, etc.). Hands must be washed

with warm water and soap. 5) *Eating, drinking, smoking, gum chewing, spitting, chewing of tooth-picks or tobacco, etc.*, in all processing, dehydrating, maintenance, and fruit storage areas is absolutely prohibited. 6) All employees will be required to wear clean, appropriate clothing for their work areas. 7) *Shoes* that provide non-slip footing on wet surfaces are recommended in the dipper area. Sandals, open-toed shoes, platform shoes, high-heels and shoes worn out to such an extent that they expose the sock or foot are prohibited in all areas.

Jewelry and Personal Property – 1) The wearing of rings (including channel or prong settings, stones, etc.), earrings (including clip-on or pierced), ornaments, or other type of jewelry is strictly prohibited in all areas. Exceptions will be made for rings that have a smooth and rounded surface that will not catch in machinery or equipment. 2) No clothing, jewelry, personal property (e.g., pouches), or personal protective gear shall be kept or stored in any area where any food product is handled except in designated areas specifically set aside for such storage.

GMP Sanitation Requirements - All employees are responsible for avoiding any possible product contamination and ensuring that all fruit processed represents the maximum quality attainable by following these practices:

1. Keep work areas clean and free of non-essential materials (rags, empty containers, string, tape, wood, cardboard, etc.)
2. Maintain a **glass-free** policy throughout the dipper, drying, and fruit storage areas.
3. Do not use trays, field bins, or portable bins for storing other items.
4. All lubricants in use should be properly labeled, handled and stored in a secure location when not in use.
5. Do not store any food or beverages, loose parts, tools, nuts, bolts, etc., on any machinery or in work stations.
6. Waste receptacles should be properly marked, emptied, and cleaned routinely.
7. Keep hoses coiled and all equipment and utensils properly stored when not in use.
8. High-traffic unpaved areas must be maintained to reduce the possibility of dust contamination.

Enforcement - All managers, supervisors, or leaders are responsible for assuring compliance by all personnel with all requirements of this policy. Responsibility for administering this policy shall be clearly assigned to competent supervisory personnel.

Additional Recommendations

Head Covering – All employees who work in processing, maintenance or other designated areas should wear an *OSHA approved “bump cap”*. A clean bump cap must be on upon entrance to areas where bump caps are required and may be removed **ONLY** after exiting the “bump cap” area. Bump caps must not be altered, painted, labeled, or modified in any way unless authorized.

Incoming Fruit Quality

The quality of incoming fresh fruit prior to dehydration can vary a great deal from grower to grower and day to day. Poor quality fresh fruit will NOT make good quality dried fruit. Fruit that is breaking down in the bins, has skin that slips off when squeezed, has a fermented odor, has abnormally low brix level, has skin breaks with mold present, or has live insect infestation is not conducive to a high quality consumer product. Deliveries with high levels of inferior fresh fruit should be rejected by the Dryer or at a minimum kept segregated for delivery as a manufacturing grade product. The flesh pressure and brix (sugar) level of the fresh fruit are attributes that contribute the most to final fruit quality.

Many growers begin their harvest each year by the calendar, not by the condition of the fruit. Every effort should be made by the Dryer personnel to schedule grower deliveries by the stage of fruit maturity of each grower. The grower will make more net income, his dry away will be lower, the undersize percentage will be reduced and the final product will be greatly improved. Harvest should begin in the orchard where the crop is the lightest which will then allow the heaviest cropped areas to mature further.

Minimum standards

- Any deliveries that are above six pounds pressure or below 16% brix should be discouraged and the grower instructed to delay harvest until proper maturity is reached.
- Fruit that arrives at the dehydrator with skins that slip, live insect infestation, or high percentage of live mold (excluding brown rot) should be IMMEDIATELY rejected by the Dryer operator.
- Dryer operators should contact the grower to inform them of any adverse fruit quality noted in deliveries as soon as possible.
- Once delivered to the dehydrator location, fruit should be dumped for drying no later than 24 hours after receipt of that fruit, preferably much sooner.

*-reading should be a composite sample of 10 pieces of fruit randomly selected.

Fruit Containers

Containers used to transport the fresh fruit to the dehydrator location (harvest bins, field bins) should be well maintained and have all broken or missing components repaired or replaced prior to use. These containers should always be cleaned each year prior to harvest. They should never be used to store **oils, greases, fertilizers, herbicides, pesticides** or any other compounds that you would not want to eat. Remember that the harvested fresh fruit comes in direct contact with the wood or plastic interior of the container and the fruit will pick up any contaminants from these containers.

Dried fruit containers are supplied to Dryers by the processor and therefore should be repaired and ready for use when they arrive. Even so, dryer operators and their personnel should make a habit of looking in those bins for foreign material prior to filling those bins with dried fruit. Those containers are stored at a variety of locations and are sometimes accessible to the public who may use them as a garbage container. They also may have some old crop fruit stuck in the bottom or corners of the bin that can contaminate the new crop fruit if not cleaned out prior to filling. Sunsweet containers, for both fresh and dried fruit, are for use only with Sunsweet Growers contracted fruit. Any misuse may result in the loss of the privilege of use.

Minimum standards

- Containers used to transport fresh fruit from the field **MUST** be thoroughly cleaned and repaired prior to use with new crop fruit.
- **EACH** dried fruit bin should be inspected for foreign material before being filled with new crop dried fruit. If that bin has any non-fruit material in it, it should be thoroughly cleaned before filling or exchanged for a clean container.

Additional recommendations

- Field containers will accumulate fruit syrup, dirt, weed seeds, leaves and other debris after several uses. It is recommended that after 4 uses, each bin is thoroughly sprayed out with water to keep from transferring box rot bacteria or other contaminants to the next bin load of fruit. Sprayers installed on bin dumpers that apply a rinsing spray to each bin as it is dumped are adequate for this purpose. Additional washing may be necessary more often later in the season.
- Badly damaged wooden bins should not be re-used until they are repaired. Contamination of the fruit and fruit damage is possible by wood splinters or metal parts of the broken bin such as post caps, screws, nails or rivets.

Water Quality

Water used in the washing of fresh fruit, machinery cleanup and bin or tray washing must be of good drinking quality and absent of unhealthy levels of toxins or heavy metals. Dipper tank water that is used over and over, without additions or replacement may impart foul odors and/or tastes on fruit as it is washed. The longer wash water is used without replacement, the higher the level of organic waste (prune skins, sugars, amino acids and dirt particles) becomes. Without proper water treatment and aeration, those organic wastes begin to decay and cause unpleasant odors. Most dehydrators are served by well water which in itself can be a cause of contamination, depending on the well.

Minimum standards

- Dipper tank water should be completely exchanged every four hours of run time, after processing 150 field bins, or at the end of the shift, whichever is latest.
- During the run, additional water should be added constantly to the tank at the rate of approximately 2 gallons per minute. This allows the non-stop dilution of the organic build-up in the dipper tank.
- Each Dryer MUST have their well or water supply system tested annually and possess a certificate showing that water to be absent of coliform bacteria. A copy of that certificate must be on file with Sunsweet before the audit will be scheduled. The test should be done by a laboratory facility that is certified to perform those tests. Those laboratories can also tell you how to treat your well so that your water supply will pass the necessary test.

Additional recommendations

- Once the water supply has received a clean certificate, make sure the well pump shaft packing is not leaking and the well casing seal is properly sealed to prevent re-contamination of the water supply. Water leaks at the well from pipe fittings, shaft packing and other sources are the most common method of re-contamination of domestic well water.
- Fresh fruit should not be left submerged in dipper tanks longer than is necessary to adequately rinse the fruit.

Drying Trays

Trays used in the drying of fresh plums receive heavy use during harvest and are constantly being wetted, filled, heated, flipped over and refilled. Each use deposits some amount of material on the trays that does not come off when the fruit load is removed. As this material builds up it can become a source of contamination for the next load of fruit placed on the tray and is also a favorite food source for insects and rodents. Because this material is naturally high in sugar, small amounts of moisture can cause the rapid growth of mold on trays. Good manufacturing practices dictate that trays be clean **before** placing fresh fruit on them to prevent contamination.

Minimum standards

- Trays must be free of loose foreign material and mold prior to use.
- Drying trays should be washed THOROUGHLY prior to the beginning of harvest. If trays have not been washed since the conclusion of last harvest, they will likely require two or more trips through the wash cycle to make them suitably clean.
- Trays should be washed with drinking quality water, applied under very high pressure (250-350 psi). The nozzles should be fan shaped and apply the thinnest stream of water possible at those pressures with the nozzles tilted to a 45 degree angle toward the moving tray.
 - Pre-soaking trays prior to the pressure sprayers can help loosen foreign material, but may also shorten the life of the trays.
 - Using hot water in the tray washing process can also help improve the cleaning.

Additional recommendations

- Washing trays after harvest and again before harvest has proven to reduce winter rodent and insect populations around dehydrators. It also reduces the amount of mold present in the spring that must be removed prior to use for fresh fruit.
- Scrubbing brushes, coupled with high pressure sprayers have been proven effective in adequately cleaning trays with fewer trips through the wash cycle and using substantially less water in the process.

Tunnel Temperatures

The maturity level of the fresh plums and the temperature at which they are dehydrated are the overriding factors in the final taste and flavor profile of the dried product. Early in the drying season fresh fruit can be exposed to higher temperatures without damage than later when fruit is at full, or past full maturity. Early season tunnel temperatures of 183 -188 degrees are not uncommon in the dehydration of fresh plums. The maturity of the fruit is constantly changing throughout the season and adjustments must be made in order to reduce adverse effects on final flavor profile. Each day, after drying begins, the threat of caramelization (burned sugar flavor) increases. Reducing drying time does not stop the occurrence of caramelization, only temperature reductions can accomplish that. Generally, caramelization will show up on the top tray of the stack first, and then move downward on the stack unless temperature corrections are made. There is NO known cure to remove a caramelized flavor from dried plums once it occurs. That fruit is then only suited for manufacturing purposes and badly caramelized fruit must be blended in with better fruit in order to temper the flavor of the juice or concentrate. Caramelized fruit can NOT be sorted out by machine or by hand. Therefore, once fruit has become caramelized, it stays in the mixture with the potential to degrade the final product.

Minimum standards

- Maximum tunnel temperatures should never exceed 190 degrees Fahrenheit, even during the early stages of the harvest.
- The top trays of the stacks should be visually inspected on a daily basis for the occurrence of caramelization. Fruit that has become caramelized is easy to spot, it has a very dull, dark color compared the normal shiny, black or reddish appearance of properly dried fruit. One taste will confirm the presence of caramelization.
 - Once it is spotted, reduce tunnel temperatures IMMEDIATELY by two to four degrees and monitor the effect of the reduction.
 - Continue to monitor and lower temperature as necessary throughout the harvest to keep the incidence of caramelization to a bare minimum.
 - REMEMBER, fast or cheap drying is not a bargain if consumers do not like the taste of the final product.

(Hint- the easiest way to check for caramelization is to walk the length of the tunnel roof looking down at the top trays that were just removed from the tunnels. The color differential of the fruit is very apparent from above.)

Moisture Levels

In order to properly store dried fruit and ensure the long term quality of the stored product, the fruit must be adequately dried and cured before shipment to the processor. Individual pieces of dried fruit can have wide variations in moisture content which is the reason for turning fruit from one bin to another to aid the curing process and allow for equilibration of the entire bin. Sunsweet has a maximum inbound moisture content of 21% that is STRICTLY enforced although other packers may have different tolerances. Some dehydrators make no effort to either monitor or test dried fruit for proper moisture levels. Improperly cured fruit leads to mold, box rot, insect infestation and possible rejection by the processor. Fruit that is properly dried retains its value based on size and quality while fruit that is improperly dried continually loses value and can result in economic loss to the grower.

It should be noted that all Sunsweet receiving locations have final authority to accept or reject based on moisture level. Member fruit that is found to be over moisture tolerance after receipt by Sunsweet may carry a handling fee of \$100.00 per bin. The Sunsweet delivery deadline dictates that fruit is pulled at the proper moisture in order to not extend the curing process and risk the delivery window. REMEMBER, properly dried fruit is the key to a successful dryer operation, reduced insects and rodents, greater fruit value and happier customers.

Minimum standards

- All dried plums in storage bins MUST be turned AT LEAST ONCE to allow proper curing before shipping to the processor.
- Moisture level measurements to determine suitability for shipment should be done with an approved moisture meter (available through DFA) rather than the “feel” method so often used. Samples for moisture testing may also be taken to Sunsweet receiving stations, or any Sunsweet Dryer location for courtesy testing.
- Care should be taken in gathering a sample for testing. Fruit should be taken from the wet side of the dehy car with some fruit being picked from the top, middle and bottom of the stack of trays.
- Trays of fruit should NEVER be pulled from the tunnels with moistures greater than 24%. Fruit pulled below 24% will usually cure normally in storage bins with proper turning. Moisture levels consistently above 23% will require adjustments to either your tunnels or the fruit load on the drying trays.

Fruit Traceability

The identity and source of fruit deliveries needs to be maintained throughout the entire drying process and delivery to the processor. Consumer safety and future homeland security concerns make this tracking an important issue today that we have not had to deal with before. Some dehydrators spend very little time in the identification and segregation of growers' individual deliveries; this breakdown in identity can lead to mixing of growers fruit, cross contamination of lots, and potential economic impact on the growers involved if the fruit quality of the two is not equal. Every grower deserves to be paid accurately and fairly for the quality and quantity of fruit they deliver to the dryer, irrespective of whom else may be delivering to that dryer. In the event of contamination or consumer recall, it is CRITICAL that the source of that product can be traced back to the original grower. More and more of Sunsweet's customers each day are requesting traceability to the actual field of production.

Minimum standards

- All fruit on trays must identified prior to the drying process to ensure that it will be kept segregated from all other growers' lots through the entire process up to the handler. Dryers that have only one grower's fruit on site at any given time may not need to identify trays with unique designations.
- Stacks of trays MUST be marked with chalk using a distinguishing name, number or letter series that is unique to only that growers' lot. All Sunsweet growers have assigned codenames for this very purpose that could be used at all dryer locations.
- Dryer operators should NOT segregate growers' fruit only by staging in a particular area of the dryer or tunnels. Once fruit is dried, it is impossible to distinguish one lot from another without some sort of identity markings. Without proper identity segregation, any contamination traced back to a particular dryer, would indict all fruit handled there as potentially contaminated.

Additional recommendations

While marking trays with chalk works fairly well, there can be an issue of the chalk being accidentally washed off by an untimely rain shower or an errant water hose. A better method is to use code cards that can be stapled to each stack of trays for identification. These cards can be pre-printed or handwritten at the time of fruit handling and it takes only one card per car of trays. If cards are handwritten, be sure to use waterproof ink pens or markers. Black Sharpie markers work well for this purpose. To be 100% safe in maintaining fruit identity, Sunsweet Dryers uses both code cards and chalk marking in their operation.

Equipment Cleaning

The quality of finished product can be positively or negatively affected by the sanitation of the equipment used to convey, transport and process it. Dehydration equipment must be kept in a clean and sanitary condition. Dirty equipment may impart undesirable odors, tastes and/or bacteria that start, or speed up the degradation of finished products. Waste buildup on belts, conveyors, shaker beds, return elevators, etc. can lead to a lower quality finished product and consumer disappointment. Due to the naturally high sugar content in dried plums, certain bacteria, yeasts and molds can rapidly multiply with a minimum amount of moisture present. The sugar buildup on dehydration equipment must be frequently removed to maintain an acceptable sanitation level.

Minimum standards

- Equipment surfaces must be maintained to prevent a buildup of slime or waste materials. Dipping / traying equipment **MUST** be thoroughly cleaned at the end of each day's operation. Special attention should be paid to any surface that is expected to come into contact with fruit, either fresh or dried. This would include belts, conveyors, dip tanks and even floors. The following are acceptable methods of cleaning equipment:
 - High pressure, COLD or HOT water
 - Steam cleaning equipmentCleaning may be enhanced by the addition of a good quality food grade detergent.
- Dipper catwalks, railings, stairs and building supports and rafters should be free of any materials that may contaminate fruit during processing (oils, greases, cleaners, tools, and clothing).
- During cleanup, all belts, conveyors, etc. should be left running while applying the available cleaning method for several minutes to wash clean any accumulation on that equipment. Special care should be paid in completely cleaning all drums and rollers on belts and conveyors of the daily buildup of fruit paste/waste that accumulates on them.
- Documentation of cleanup procedures and training are required to be maintained by all facilities.
- All gearbox motors above any fresh or dried fruit must have a drip pan installed capable of holding all the fluid in the gearbox with a drain hose reaching the ground in an area that will not contaminate fruit.
 - Drip pans and hoses are required even if food grade gear lube is contained in the gearbox.

- In the event that it is not feasible to install drain hoses, drip pans must be designed in a manner that will allow easy access / removal for routine cleaning and the cleaning procedure must be documented.

Additional recommendations

- Prior to the start of harvest, any shed or building directly over dipping equipment or dried fruit storage should be rid of bats, birds, birds nest, spider webs and other foreign material.
- As floors and external surfaces of dipping equipment begin to build up with algae, dry granular chlorine can be used to reduce or rid those areas of algae.
- Liquid chlorine injectors also work well at levels of 0.2 – 0.5 PPM.
- If chlorine is used in processing, a suitable chlorine test kit must be on site along with written record of the test results to prove the proper use of chlorine. Extreme care must be used when handling chlorine products.
- All lubricants and greases used on equipment over the flow of fruit should be certified food grade.

Trash Containment and Disposal

Solid waste (leaves, sticks, dirt clods, tree limbs) is most effectively and economically separated and discarded in the orchard at the time of harvest. The disposal in the field actually makes everyone money, the grower enjoys a better dry away and pays less drying cost and the dehydrator operator has reduced handling and operational costs. With future penalties to growers with deliveries that are over tolerance in trash, it is critical to discard this solid waste as soon as possible in the harvesting operation. For any waste that is delivered to the dehydrator, it is also best to remove it as early in the drying operation as possible. Some dryer operators can dispose of this material on their own property by incorporating into the soil or burning once it is dry. These are both acceptable methods, provided the guidelines below are followed. Most dehydrators remove solid waste to county landfills or other approved disposal sites which is the preferred method.

Minimum standards

- Solid waste containment should be located on a concrete, or other hard, washable surface and be placed as far away as possible from fruit dipping and fruit storage areas.
- Solid waste containers should be dumped often, daily is preferred, but should not be held for longer than 48 hours without dumping. Any container not dumped within 48 hours, should be treated with an approved insecticide.
- Each time containers are removed for dumping, the containment area **MUST** be thoroughly washed down to eliminate sugar and juice buildup and subsequent infestations of flies, gnats and beetles.
- For dehydrators that are able to dispose of solid waste on their property, care must be exercised in choosing a disposal area that is as far as possible from the processing\drying facility, one-quarter mile minimum, one-half mile better.
 - Spreading the solid waste material as it is dumped will speed up the drying and substantially reduce odors, insect and rodent populations.
 - Growers who habitually deliver higher amounts of trash should be counseled and given every opportunity and incentive to improve their habits.

Additional recommendations

- At the conclusion of harvest, all solid waste containers should be dumped, thoroughly washed and treated with an approved insecticide prior to winter. The waste containment area should also receive a final thorough cleaning and insecticide treatment at the conclusion of harvest.

- Additional installations of fans, blowers, aspirators, etc. in the drying operation to treat the fruit before, or after drying, can greatly enhance the final quality of the product by applying an additional treatment prior to the fruit be put into storage bins and may help eliminate penalties to growers.

Water Disposal

In the normal drying and processing of dried plums a substantial amount of water is required in the various operations. In the drying function, a large amount of water is required for rinsing the fruit and separating any trash from the fruit as well as substantial water being used in equipment cleanup and sanitation. This process and wash water must be disposed of on a constant basis. Some dryers are connected to Municipal sewer systems which are very effective for water disposal. Other dryers send their process water to adjoining properties to be used for irrigation or simply allowed to evaporate. Process water applied to the landscape for evaporation will likely require permits from the State Water Quality Control Board and periodic inspections. This water is normally high in organic compounds and can become an odor and insect nuisance if not managed properly. The management of this processing water is a key ingredient in the overall sanitation of the drying operation and important in preventing complaints and abatement orders from the County and State.

Minimum standards

- Process water should never be transported by way of open ditch to the disposal area. An open ditch system has the potential for a wide variety of insect, sanitation, human health and safety issues that could become very serious. This water should be sent to disposal via enclosed piping, preferably underground.
- The water should be screened prior to disposal to remove as many solid particles as possible, which contribute the most to odors.
- The final disposal area should be as far as possible from the dryer. It should also not be located directly adjacent to any neighboring houses to prevent nuisance complaints.
 - These evaporation/percolation fields should NEVER be allowed to have standing water in them for more than 24 hours. Standing water will increase insects, especially mosquitoes, and will become anaerobic (without adequate oxygen), which dramatically increases odor.
 - Evaporation fields should be divided and the water application should be rotated every few days to get maximum use from the acreage, but not allow ponding of water to take place.

Additional recommendations

- There are some very effective odor-masking agents on the market today that can be applied pre-evaporation, or sprayed on or dripped into process water post-evaporation. These agents can be very effective in covering up the odor of process water disposal fields if applied correctly, but are usually quite costly.
- If this process water is used for irrigation, it is best to dilute it by 50% with fresh water in order to bring the ph closer to neutral.

Insect Control

The environment surrounding prune dehydrators is nearly the perfect situation for a variety of insects to survive, multiply and flourish. Warm temperatures, adequate moisture, ample waste material and the sweet smell of fruit sugar are a great combination for insect populations. Despite what some believe insects are not just a nuisance but can be a major source of damage to dried fruit. A large variety of insects are attracted to fresh and dried plums. Once they discover the stored fruit, if left uncontrolled, the populations can explode and create real damage to the final product. As mentioned in previous sections, the biggest allies to insect populations are mismanaged process water, improperly handled solid and household waste and incorrectly dried fruit (too wet). Fruit that is stored at a moisture level that is too high can begin to experience decay within several days and the slightest hint of decay will attract insect pests of dried fruit from far and wide. They will immediately begin feeding on the decaying fruit and will not be totally eliminated until that fruit is fumigated sometime in late October after damage has already occurred. House flies, yellow jackets, meat bees, fruit flies (*Drosophila*), mosquitoes, dried fruit beetles, Indian meal moths and carrion beetles are all fairly common pests that occur around the dehydrator environment.

Minimum standards

- Just prior to the beginning of harvest, all processing areas should receive an insecticide treatment to eliminate any pre-existing insect pests. This includes dipping areas, dried fruit storage areas, solid waste collection areas and any processing water storage or treatment area. Endure 35 WP is a good broad spectrum material that can be applied to the entire drying/processing area. Keep solid waste containers dumped frequently and keep container storage area clean and washed down. If solid waste containers will not be dumped within 48 hours, treat that container with an approved insecticide to keep insect populations in check.
- When working with insecticides, be sure to follow label directions.
- NEVER store insecticides on catwalks or ledges near fresh, or dried fruit and always leave those chemicals in their original containers.
- Manage processing water with the same enthusiasm as you do dipper crews and tunnels. Wash equipment frequently, keep dipper tank water fresh and do not allow pooling of water in any evaporation field area.
 - REMEMBER, solid waste and waste water are the two biggest culprits in the outbreak of unwanted insects.
- NEVER store high moisture (over 24%) fruit in storage bins. Leave it on trays for a few extra days to allow the moisture to drop before boxing that fruit.

Rodent Control

Rodents may be the most serious threat to sanitary final products, product contamination and the transmission of pathogenic organisms. Mice and rats have long been associated with unsanitary and undesirable conditions. They have no place near where food products, either raw or finished, are stored. Each year, Sunsweet receives deliveries that show positive signs of rodent activity in the bins of fruit. We need to do everything possible to keep them out of all drying/processing facilities and if failing that, keep them out of, and away from the fruit. Rodents are attracted to fruit as a source of nutrition and begin moving from fields and ditches into dehydrators when the food source at the dryer becomes more attractive than what is left in the field. Severe weather can also lead to an influx of rodents coming out of the fields to gain relief from the weather. Because some dried plums are sold as natural condition and actually get no more processing or treatment after the drying process, it is ABSOLUTELY necessary to keep rodents of all types away from dried fruit. The most important ingredient in eliminating rodent populations is good housekeeping. Stacks of pallets, bins, broken trays, weeds and surplus equipment all provide the kind of sanctuary necessary for rodents to survive and reproduce.

Minimum standards

- Bait stations should be numbered, anchored, and placed at fifty foot intervals around the exterior of warehouses and any fence lines within 100 feet of any fruit handling or storage areas.
- Bait stations should NEVER be used inside warehouses while product is being stored.
- Use only anti-coagulant type baits and change the bait if it becomes deteriorated due to age or weather.
 - Outdoor bait stations should use Generation place bait packs in dry weather and Talon Weather Blox bait during wet weather.
 - A popular style of bait station is Eaton's rat sized station with the plastic liner.
- Bait stations MUST be serviced on a year round schedule with bait stations being monitored monthly from November through July and monitored weekly from August through October.
- Enclosed warehouses should have glue boards around the inside walls every twenty feet as well as directly inside, both sides of each entrance.
- These glue traps should also be place in and around shop areas, lunch rooms and office buildings.
 - A good combination seems to be a mixture of Catch Master glue boards for mice and Catch Master glue trays 48R for rats.
- The record keeping part of this program is JUST as important as the actual monitoring and must include a *map* of the facility showing placement of bait stations **and** glue boards by number.

- Inspection records **MUST** be logged by bait station number, the date serviced, indication of activity, and amount of bait used to refill.
- Likewise, glue board activity must be monitored and logged. Glue traps should be dated when they are laid out and checked at least once per week. They should be replaced when they get enough debris stuck on the surface to reduce their ability to catch rodents.
- MSDS sheets **MUST** be maintained for all pesticides, glue boards and rodent bait.
- Eliminate the hiding, living and breeding areas of rodents, known as harborage areas, by removing trays, bins, pallets, stored equipment and any weeds and other debris that may be present. Rodents need places to hide where they feel safe and these piles of scrap materials are just what they like.
 - **A good housekeeping program will have more of a positive impact on rodent populations than anything else you may do.** As you accumulate broken trays and bins during harvest, store them as far away from fruit storage areas as possible. Once again, keep solid waste and household trash picked up and hauled off the premises on a frequent schedule.
- Dried fruit storage areas should have a fifty foot clear area on all sides with no harborage present.

Additional recommendations

Inspect all buildings and fruit storage warehouses for loose or missing siding, and gaps and spaces around doors and other entry points. Sealing these breaches is the best form of protection because it creates a physical barrier to rodent entry which is the only foolproof method known to man. Once the integrity of the walls and siding is corrected, sealing doors and entry ways allows you to close those points when you are not actively working in those buildings and keep out unwanted guests. It only takes a hole as big as the diameter of a wooden pencil to allow a house mouse to gain entry.

Fruit Storage

The storage of fruit after dehydration is a critical component in the final quality of that product. Fruit should not be stored for a prolonged period at dehydrator locations but should be sent to processors who have a more sanitary environment and the ability to fumigate fruit. Dried fruit is stored in a variety of ways throughout the industry including enclosed buildings, pole buildings and no buildings at all. Storage under any type of roof is generally better than no roof at all, to keep bird contamination to a minimum. Under roof storage also provides great piece of mind should a fall storm arrive prior to shipment of fruit to the processor. The prime consideration in dried fruit storage should ALWAYS be to eliminate, or minimize product contamination. Sanitary storage should be the goal of all dehydrators and processors. Many months of careful cultural work to grow a top quality product can all be quickly lost under poor storage conditions.

Minimum standards

- Fruit should be stored as far as possible from dusty orchards, busy roads or any other potential source of contamination.
- Storage buildings of any type, enclosed or pole sheds, MUST be thoroughly cleaned prior to the start of harvest.
 - All rafters and ledges under roof should be cleaned and made free of bird nests, spider webs and any accumulated dirt and dust.
- Storage buildings MUST have proper bait boxes outside and glue traps inside as defense against rodents.
- Any light fixtures under roof should have tube, or bulb guards to prevent glass contamination in fruit should a bulb break.
- Building walls and siding should be kept repaired and intact as a physical barrier against rodents.
- Walk-through and drive through doors of buildings should be repaired and usable so they may be closed during off hours and provide additional physical barriers to rodents, and primarily birds.
- Building roofs should also be kept functional to prevent moisture or dirt contamination of fruit.
- Outdoor storage should be maintained on concrete or other paved type surfaces.
 - Fruit should only be stored outdoors if indoor storage is not available and moved indoors or shipped to the processor as soon as possible.

Additional recommendations

Because few dehydrators can fumigate, any beetle or insect infestation in the stored fruit will continue to survive and propagate until the fruit is fumigated.

Pole sheds offer many advantage for storing and curing dried fruit. However, any fruit under pole sheds during inclement weather should be moved back from the edge towards the middle of the shed. Even the slightest wind will blow rain water one-third of the way across a tall pole shed.

Contaminated Fruit

In the course of drying and processing fruit, it is inevitable that some quantities of fruit will become damaged and/or contaminated. Fruit that becomes damaged (dropped to the ground, stepped on, and smashed) may end up being unsightly, but generally poses no real threat to consumers. Damaged fruit in large amounts can become costly to the grower in the form of hand sorting costs. Contamination however, is an entirely different situation. Fruit, fresh or dried, that falls to the ground does not necessarily become contaminated due to contacting the floor. Fruit on the ground in some cases comes into contact with non-food contaminants that can render the product unfit for consumption. There is a vast difference between picking up fruit off the ground and picking up fruit that is contaminated and should be discarded. Dryer operators and processors need to work hard at eliminating spillage, which in turn, would stop most all contamination of fruit. If spillage is kept at a minimum, any fruit discarded will be minimal and the corresponding economic impact will be minor.

Minimum standards

- Great care must be exercised in the training and supervision of employees who clean up spilled fruit to be certain they know what can be salvaged and what **MUST** be dumped. Emphasis in dehydrators should be placed on engineering and maintenance designed to eliminate ALL spillage.
 - Fruit that hits the floor and is immediately picked up should be returned to the lot unless that fruit has become contaminated.
 - Fruit spillage in Dryers that are operated by hydraulic systems should be discarded as there is no way to prevent contamination.
 - Damaged fruit, which is not contaminated should be picked up and placed in a central bin housing only damaged fruit. That fruit can be used by most processors for juice or manufacturing products. Placing it in a central bin also eliminates the danger of a grower being hit with hand sorting for damage not caused by them. If a dehydrator creates an inordinate amount of damaged fruit, or does a big volume of custom drying, they should create a central bin for each grower who delivers to them to hold that members damaged fruit.
- Fruit that somehow comes into contact with diesel, gasoline, hydraulic oil, motor oil, pesticides, herbicides, fungicides, rodent bait, or other non-food contaminants **MUST** be disposed of. That type of fruit should never be mixed with non-contaminated fruit or **EVER** delivered to the processor. A consumer complaint regarding dried plums that tested positive for any of these type contaminants could have **DISASTROUS** effects on the entire industry and its growers.

Restrooms

Common decency and State law require that employees working with food products have suitable restrooms with working toilets and hand washing facilities. Convenient, clean restrooms have proven to boost morale, help daily attendance and even improve production. The State of California has a complete list of restroom requirements for employees which can be accessed through the local County Health Department.

Minimum standards

- Employee restrooms should be clean and well lit.
- Wash water, soap, and disposable paper towels **MUST** be available for proper washing after restroom use.
- Suitable trash receptacles must also be provided for collection of the single use towels.
- Separate, lockable men's and women's restrooms must be available to service all employees, unless portable toilets designed for use by both sexes are made available.
- Restrooms should be located as to be convenient for employee access (on dryer property, not in orchard).
- Restrooms should be cleaned daily and care should be taken to keep foul odors to a minimum.
- Restroom design should be such that it will exclude flies and insects from entering.
- Any malfunction within restrooms **MUST** be corrected immediately.

Additional recommendations

If portable toilets are used at dehydrator locations, placement of those units in the shade will greatly improve their inside comfort and odor level. Most are made of poly plastic which becomes very hot inside when placed in direct sunlight. If portable toilets are used, hand washing facilities **MUST** still be provided.

Appendix A

GOOD MANUFACTURING PRACTICES (GMP)

Good Manufacturing Practice regulations (GMPs) are used by food manufacturers as they produce and test products that people consume. In the United States, the U.S. Food and Drug Administration (FDA) has issued these regulations as the minimum requirements to which manufacturers must adhere in order to ensure a modicum of food safety and manufacturing responsibility. In accordance with the Code of Federal Regulations, Title 21, Volume 2, Chapter 1, Part 110, Section 19a, Exclusions, as revised April 1, 1999, dehydrating facilities are NOT exempt from these regulations as the processes performed include cleaning, drying, and storing of processed commodities.

1. CLOTHING

- I. All employees will be required to wear appropriate clean clothing in their work areas.

2. HEAD HAIR COVERING

- I. All employees must wear proper head hair covering at all times. Proper head hair covering is defined as follows:
 - i. Caps: Baseball-styled hats that cover the entire head may be worn. Visor styled caps are not acceptable.
 - ii. Bandannas: Cloth bandannas, or cloth head coverings, may be worn over the head hair.
 - iii. Caps or bandannas must be worn on the head at all times while in the work and fruit storage areas and must cover all of the head hair area except for sideburn areas.
 - iv. The wearing of bobby pins, safety pins or other similar devices to secure caps or bandannas is strictly prohibited.

3. FACIAL HAIR

- I. Mustaches shall be nearly trimmed and not be exceptionally bushy.

4. SHOES

- I. Shoes that provide non-slip footing on wet surfaces are recommended in the dipper area. Sandals, open-toed shoes, platform shoes, high-heels and shoes worn out to such an extent that they expose the sock or foot are prohibited in all areas.

5. GLOVES

- I. Gloves are provided by the Company and must be worn when working with processed fruit as follows:
 - i. Whenever the employee has a non-infectious cut or wound. The cut or wound must be properly covered before putting on gloves or other designated protective gear.

- II. Whatever can contaminate a human hand can also contaminate a disposable glove. Therefore, whenever hands should be washed, a new pair of disposable gloves should be worn. Never reuse or wash disposable gloves.

6. JEWELRY AND PERSONAL PROPERTY

- I. The wearing of rings (including channel or prong settings, stones, etc.), earrings (including clip-on or pierced), ornaments, or other type of jewelry are strictly prohibited in all manufacturing and maintenance areas. Exceptions will be made for rings that have a smooth and rounded surface that will not catch in machinery or equipment.
- II. No clothing, jewelry, personal property (e.g., pouches), or personal protective gear shall be kept or stored in any area where any food product is processed or handled except in designated areas specifically set aside for such storage.

7. PERSONAL HYGIENE

- I. Always wash hands:
 - i. Before and after food handling.
 - ii. Before and after each visit to the lunchroom or restroom.
 - iii. After touching human body parts.
 - iv. After coughing, sneezing, using a handkerchief or tissue, using tobacco, eating, or drinking.
 - v. After engaging in any activities that may contaminate hands (taking out the garbage, fixing machinery, handling chemicals, picking up dropped item, etc.)
 - vi. With warm water and soap. A brush can be helpful when cleaning hands.
- II. Maintaining personal habits:
 - i. Bathing, washing, and restraining hair.
 - ii. Keeping fingernails short and clean.
 - iii. Nail polish or false nails are not allowed for employees who work with food.
 - iv. All employees are responsible for taking all precautions necessary to protect food and food-contact surfaces against any type of contamination.
- III. All employees are responsible for reporting when sick to avoid spreading possible infections.
- IV. Eating, drinking, smoking, gum chewing, spitting, chewing of tooth-picks or tobacco products, etc., in all processing, dehydrating, maintenance and fruit storage areas absolutely prohibited.

8. HEALTH

- I. The Dryer Manager will determine necessary action on any reported health cases that may affect food, food packaging materials, and food contact surfaces.
- II. Any person who, by medical examination or supervisory observation, is shown to have, or appears to have, an illness, open lesion, including boils, sores, or infected wounds, or any other abnormal source of microbial contamination by which there is a

reasonable possibility of food, food-contact surfaces, or food-packaging materials becoming contaminated, shall be excluded from any operations which may be expected to result in such contamination until the condition is corrected. Personnel shall be instructed to report such health conditions to their supervisors.

9. GMP SANITATION REQUIREMENTS

All employees are responsible for avoiding any possible product contamination and ensuring that all products produced represent the maximum quality attainable by following these practices:

I. Dehydrators:

- i. Keep work areas and aisle ways clean and free of non-essential materials (rags, empty containers, string, tape, wood, cardboard, etc.).
- ii. Maintain a **glass-free** policy throughout the dipper, drying, and fruit storage areas.
- iii. Do not use trays, field bins or portable bins for storing other items.
- iv. All lubricants in use should be properly labeled, handled and stored in a secure location when not in use.
- v. Do not store any food or beverages, loose parts, tools, nuts, bolts, etc., on any machinery or in work stations.
- vi. Waste receptacles should be properly marked, emptied, and cleaned routinely.
- vii. Keep hoses coiled and all equipment and utensils properly stored when not in use.
- viii. High-traffic unpaved areas must be maintained to reduce the possibility of dust contamination.

10. Enforcement

All managers, supervisors, or leaders are responsible for assuring compliance by all personnel with all requirements of this policy. Responsibility for administering this policy shall be clearly assigned to competent supervisory personnel.

I have received, read, and understand all the information contained within the Good Manufacturing Practices (GMP) guidelines and will comply with all items mentioned.

Employee's Name: _____

Employee's Signature: _____

Date: _____

Appendix B

Listed below you will find item descriptions along with some vendors names, addresses and phone who handle those items. This page is being provided for your use in sourcing some of the items listed in this manual. These vendors, listed below, are not the only ones who may handle these products, but are vendors who have handled and have sold to Sunsweet Dryers in the past. You are not required to purchase the items from only the vendors listed here.

Bait stations, bait, glue traps, insecticides

Cardinal Professional Products
10 North East St Suite 207
Woodland, Ca. 95776
1-800-548-2223

Cardinal Professional Products
8770 Highway 25
Hollister, Ca. 95204
1-800-548-2223

Food Grade Lubricants

Frontier Performance Lubricants
P.O. Box 1777
Lodi, Ca. 95241
1-800-807-4496

Applied Industrial Technologies
3076 Colusa Hwy
Yuba City, Ca. 95993
530-671-0700

Odor Masking Agents

Alco Products Inc.
13126 Saticoy St.
No. Hollywood, Ca. 91605-3467
818-764-7700
530-347-1306 Local sales rep

Blue Stripe
19101 Kent Ave.
Lemoore, Ca. 93245
559-924-5025

Tough skin light bulbs and protective tube guards

Norcal Rexal Pacific
1003 Stabler Lane
P.O. Box 3235
Yuba City, Ca. 95992
530-671-1900

Orchard Supply Hardware
1262 Stabler Lane
Yuba City, Ca. 95993
530-751-1127

Food Grade Detergent

Zep Products
1-877-428-9937

Fruit pressure testers and refractometers

Bremers Ace Hardware
1012 Hazel St.
Gridley, Ca. 95948
530-846-3623

McMaster Carr
P.O. Box 54960
Los Angeles, Ca. 90054-0960
562-692-5911

Drop Box service (Solid waste containers)

Yuba Sutter Disposal
3001 N. Levee Rd.
Marysville, Ca. 95901
530-743-6933

Green Waste of Tehama County
530-527-4281

Water Testing Laboratories

Monarch Laboratories
563 E. Lindo Ave.
Chico, Ca. 95926
530-343-5818

Western Water Testing
610 C St.
Marysville, Ca. 95901
530-742-8378

Moisture Testing Machines

DFA of California
760 Stafford Way
Yuba City, Ca. 95991
530-673-6417

Granular Chlorine and Chlorine Test Kits

Wal Mart
Various locations

Any Pool Supply Store

Aspirators and Trash Removal Equipment

LMC Corp.
5300 Claus Rd.
Riverbank, Ca. 95367
1-800-562-72

Gene M. Jessee Inc.
1627 Nord Ave.
Chico, Ca. 95926
530-342-2909