

## Quality Standards and Inspection

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The U.S. raisin inspection program is authorized by Federal Raisin Marketing Order No. 989. The Order covers marketing issues and regulations for California raisins and is administered by the Raisin Administrative Committee as described in chapter 2, The Raisin Industry Federal Marketing Program. The Processed Products Branch of the USDA Agricultural Marketing Service is the agency named to carry out the inspection and certification.

### INCOMING INSPECTION

All raisins are inspected for incoming grade and condition upon delivery to a raisin handler (Plates 31.1 through 31.7). The steps and procedures are outlined in Figure 31.1. When the raisins are delivered to the receiving station, the inspector receives a *Request for USDA Inspection* or scale tag that identifies the load's declared varietal type. After the load is weighed, it is taken to the unloading dock where a specified number of containers are marked for dumping and sampling on the sand shaker (Figure 31.2). If three or fewer bins are delivered, all of them are dumped and sampled from the sand shaker. If the load contains four to twelve bins, three bins are dumped. For larger loads, at least 25 percent of the bins are dumped (a specified number is listed in the inspection guidelines for each size of load). During shaking, the inspector samples five random handfuls per bin while looking for signs of high moisture and defects such as mold or contamination. These samples are then composited for laboratory tests. The sand removed by the shaker is also weighed to determine the sand tare for net weight (Figure 31.3).

The remaining bins on the load are placed in rows on the dock for inspection and sampling (Figure 31.4). The inspector, using a pry-bar probe, will take

five handfuls from each bin for a second composite sample (Figure 31.5). If at any time during dumping and pry-bar sampling the inspector observes a failing or questionable condition is observed, he or she will request that all bins be dumped until five bins in succession meet grade. If both samples (sand shaker and pry bar) pass visual inspection, they are composited for laboratory tests, including moisture, airstream sorter analysis, and other tests as needed (these may include microanalysis for insect, rodent, or other microscopic contamination, mold, and embedded sand). Once at the unloading dock, all containers are automatically red-tagged. This maintains control of newly delivered lots until they can be released to the handler. Red cards are removed from lots that meet Marketing Order requirements and can go directly to the handler for fumigation and storage. Questionable or obviously failing lots are held for verification tests in the laboratory (Figure 31.6). The producer of a failing lot can request an appeal inspection, leave the lot with the handler for reconditioning, ship it to a dehydrator for outside reconditioning, or haul it back to the farm.

The incoming moisture and maturity requirements for the various raisin types are given in Table 31.1 (Figures 31.7, 31.8, and 31.9). The maximum allowable moisture is 16 percent for all types except for dehydrated (golden and dipped) or oleate-treated raisins, for which it is 14 percent. Maturity is in most cases measured with the airstream sorter (Figure 31.10), with exceptions as noted. The maturity of 'Flame Seedless,' 'Monukka,' other seedless, 'Sultana,' and 'Muscat of Alexandria' is determined visually due to the widely varying physical characteristics of these varieties.

Grade defect limitations, including mechanical damage, sunburn, sugaring, caramelization, mold, and uncured berries, are given in Table 31.2. Damage can total no more than 10 percent by weight for all categories listed, and no more than 5 percent for any one category. Mold is determined by boiling the sample for

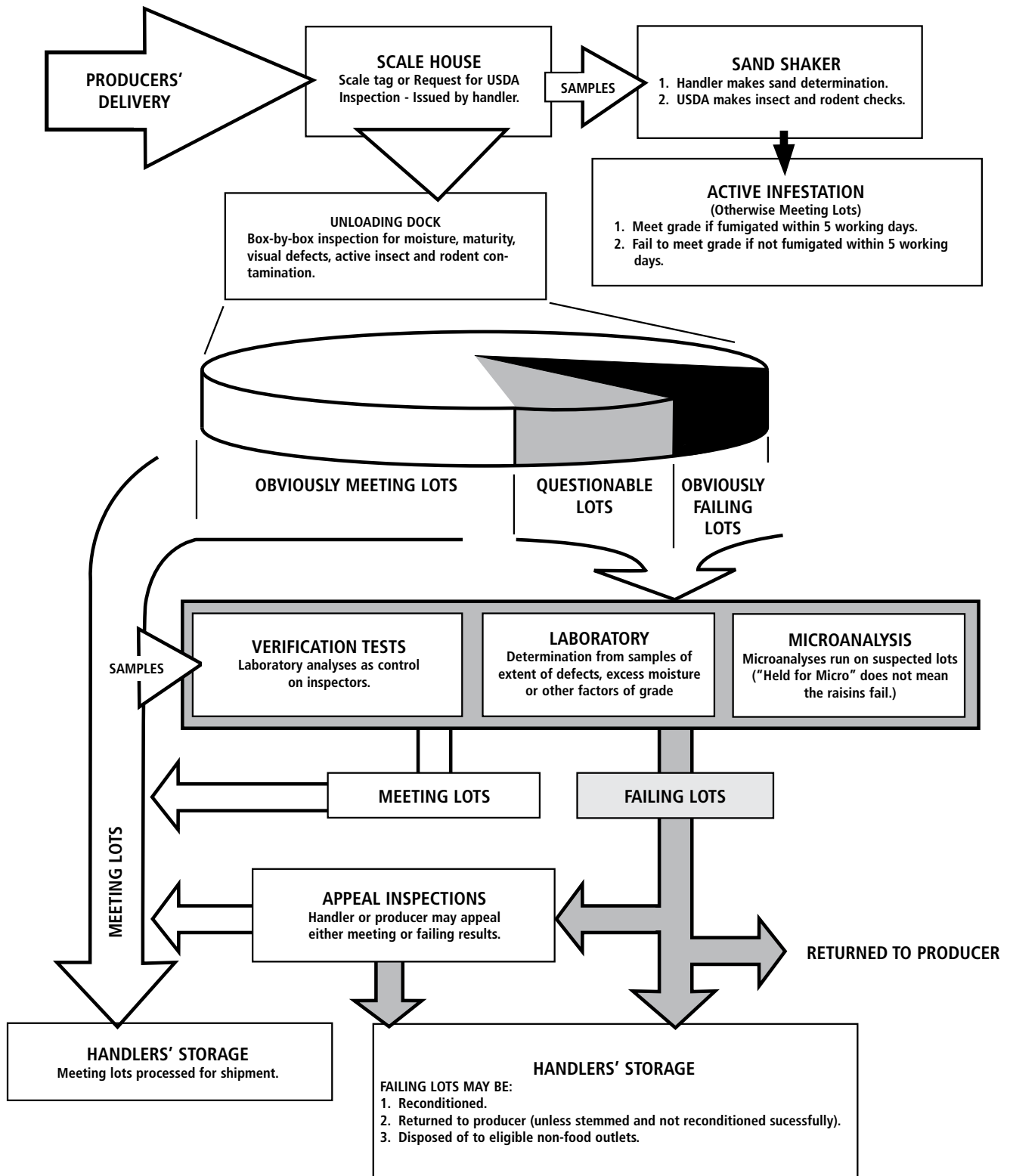


Figure 31.1 Raisin receiving and inspection flow chart



**Figure 31.2** At least one-quarter of the bins from each load are dumped over a shaker. A USDA inspector draws a sample of raisins from throughout the bins. *Photo: Jack Kelly Clark.*



**Figure 31.3** Sand that falls through the shaker is collected when bins are dumped. The sand is weighed and the average per bin is deducted from gross weight delivered. *Photo: Jack Kelly Clark.*



**Figure 31.4** At most 75 percent of the bins are sampled without being dumped. Those bins are placed on the ground so the USDA inspector can sample each container. *Photo: Jack Kelly Clark.*



**Figure 31.5** Inspectors use a 24-inch tempered spring steel prybar to facilitate sampling. The prybar allows inspectors to lift raisins and draw a sample from beneath the surface. *Photo: Jack Kelly Clark.*



**Figure 31.6** Moldy raisins are separated for scoring. Putrid mold (the most common) is scored if half or more of the berry is affected. Nodular mold covering one-eighth of the berry surface is scored. Split mold is scored if it extends one-half the length of the berry. *Photo: Jack Kelly Clark.*

**Table 31.1** USDA incoming inspection standards for raisin moisture and maturity

Variety	Maximum moisture %	Substandard %			B or better %			Method <sup>†</sup>
		Meet	Dockage	Fail	Meet	Dockage	Fail	
Natural seedless*	16.0	≤5.0	5.1 to 17.0	17.1+	50.0+	49.9 to 35.0	34.9–	A/S
Golden seedless*	14.0	≤5.0	5.1 to 17.0	17.1+	50.0+	49.9 to 35.0	34.9–	A/S
Dipped seedless*	14.0	≤5.0	5.1 to 17.0	17.1+	50.0+	49.9 to 35.0	34.9–	A/S
'Oleate' and related seedless*	14.0	≤5.0	5.1 to 17.0	17.1+	50.0+	49.9 to 35.0	34.9–	A/S
'Flame Seedless'	16.0	≤5.0	5.1 to 17.0	17.1+	50.0+	49.9 to 35.0	34.9–	Visual
'Monukka'	16.0	≤5.0	5.1 to 17.0	17.1+	50.0+	49.9 to 35.0	34.9–	Visual
Other seedless‡	16.0	≤5.0	5.1 to 17.0	17.1+	50.0+	49.9 to 35.0	34.9–	Visual
'Zante Currant'	16.0	≤12.0	12.1 to 20.0	20.1+	N/A	N/A	N/A	A/S
'Sultana'	16.0	≤12.0	12.1 to 20.0	20.1+	N/A	N/A	N/A	Visual
'Muscat of Alexandria'	16.0	≤12.0	12.1 to 20.0	20.1+	N/A	N/A	N/A	Visual

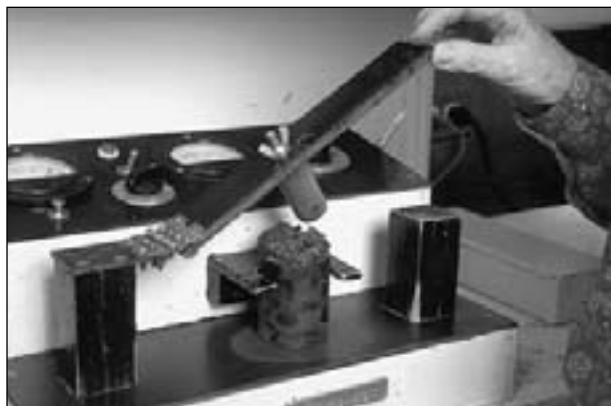
\*Includes 'Thompson,' 'Delight,' 'Emerald,' 'Fiesta,' 'Perlette,' and 'Superior Seedless'

†-A/S = airstream sorter

‡'Ruby Seedless,' 'Black Imperial,' 'Beauty Seedless,' 'Blush Seedless' (sun-dried or dipped)



**Figure 31.7** Laboratory technicians grind raisins into paste for moisture testing. The paste will be kneaded to remove air and help equalize the moisture in the sample. *Photo: Jack Kelly Clark.*



**Figure 31.8** Raisin paste is placed in a plastic cylinder atop an electrical terminal and a probe from the opposite terminal is inserted into the paste. Moisture percentage is measured as the electrical resistance between the two terminals. *Photo: Jack Kelly Clark.*



**Figure 31.9** Accurate determination of moisture percentage requires that correction be made to compensate for temperature. The thermometer must be placed carefully into the raisin paste; it should not touch the probe or the cylinder. *Photo: Jack Kelly Clark.*

20 minutes and separating the individual raisins containing sufficient amounts of mold. Only 5 percent by count of any mold type or combination of types is allowed. The three types of mold separated and scored after boiling are *putrid* (one-half or more of the raisin affected), *split* (one-half or more of the raisin length showing black discoloration in the split portion), and *nodular* (an aggregate of one-eighth or more of the surface affected).

Generally, the categories under soundness or wholesomeness of the product are listed as zero tolerance or a very low tolerance as shown in Table 31.2. The zero-tolerance items include embedded sand, sandburs, eucalyptus material, fermentation, and glass or other



**Figure 31.10** Airstream sorter machines are used to determine maturity. “Substandard” (Sstd) or “B or better” (B&B) raisin grades are sorted using a continuous airflow at a constant temperature and pressure. *Photo: Jack Kelly Clark.*

deleterious material. Feathers (from both domestic and wild sources) cannot exceed four per bin. Any rock or hardpan material  $\frac{1}{8}$  inch or larger is considered a rock. One rock per bin or sweat box determines presence, and the container is thus identified (ROCKS stamp) to aid the processor in rock removal. Contamination includes bunch rot, insect, and rodent contamination. Containers with contamination evidence are held for *micro* (microscopic analysis) and examined for compliance with U.S. Food and Drug Administration defect action levels.

The inspector also checks for normal characteristics such as color, flavor, and odor for the varietal type. Lots containing more than 2 percent of a similar varietal type are certified as “Mixed Variety” lots. The inspector uses a worksheet to report the approximate percentage of each type. If any lot contains dissimilar varietal types, regardless of percentage, it is classified as “Mixed Variety,” for which there is no tolerance. This includes ‘Thompson Seedless’ mixed with seeded varieties such as ‘Muscat of Alexandria,’ ‘Cardinal,’ ‘White Malaga,’ or ‘Italia.’ Mixed varieties are not viewed as desirable by the raisin handler.

The inspection procedures are outlined in greater detail in the *Handbook for Inspecting and Receiving of Natural Condition Raisins* used by the inspectors. The standards are set by the Raisin Administrative Committee and approved by the USDA, Marketing Order Administration Branch. The procedures, reports, and records are maintained by the Inspection Service.

**Table 31.2** USDA incoming inspection standards for defects

Grade defects (limiting percentages)	Limit
<b>A. Damage</b>	
Damage (includes chewed)	5% by weight
Sunburn	5% by weight
Sugaring	5% by weight
Carmelization	5% by weight
Other	5% by weight
Total damage	10% by weight
<b>B. Mold</b>	
	5% by count
<b>C. Uncured berries</b>	
	5% by weight
<b>D. Moisture</b>	
Natural condition	16.0%
Dehydrated	14.0%
Soundness of product (wholesomeness)	Tolerance
<b>A. Extraneous material (visible)</b>	
Embedded sand	0
Sandburs	0
Eucalyptus pods or leaves	0
<b>B. Fermentation</b>	
	0
<b>C. Deleterious material:</b>	
glass, excrement, etc.	0
Mark containers “not for human consumption”	
<b>D. Feathers</b>	
Per bin	4
Per sweat	1
<b>E. Rocks (not a failing defect)</b>	
Flag PCCs with “rocks” stamp	N/A
<b>F. Contamination</b>	
Hold for microanalysis	FDA defect
1 subsample per 12,000 lb	action levels

## OUTGOING INSPECTION

The processed, outgoing raisins are also inspected under the same marketing order, but with different requirements and standards than apply to incoming raisins. Inspection methodologies also differ. For example, the maximum allowable moisture is 18 percent for seedless raisins except the ‘Monukka’ variety, which has a maximum of 19 percent. “U.S. Grade A” raisins must contain not less than 80 percent B and better maturity grade, by weight. Maturity grades such as B and better are graded visually, raisin by raisin, rather than with the airstream sorter for all varietal types. Processed raisins are also graded by size, appearance, and stem and capstem count, as well as presence of damage, mold, or sand contamination.

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**R E F E R E N C E S**

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- Anonymous. 1996. Lab procedures for natural condition raisins. Washington: USDA, AMS Fruit and Vegetable Division, Processed Products Branch.
- Anonymous. 1996. Training handbook for inspection and grading of processed raisins. Washington: USDA, AMS Fruit and Vegetable Division, Processed Products Branch.