

Report on the First Meeting of the National Working Group on Stored Vehicle Tare Weights

September 27-29, 2004

Sponsored by the National Institute of Standards and
Technology's Weights and Measures Division and the
National Conference on Weights and Measures



NIST
National Institute of
Standards and Technology



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I. Overview

The primary goal of this National Working Group (NWG)² is to develop recommendations (e.g., good weighing practices, new method of sale of commodities requirements, or amendments to the Uniform Weights and Measures Law) on stored vehicle tare weights to help State and local weights and measures officials to improve the accuracy of commercial weightments made over vehicle scales. A second goal is to develop informational brochures, reports, and presentations to educate users about weights and measures laws that require accuracy for commercial transactions based on good weighing practices.

When using a commercial weighing system, such as a vehicle scale, businesses can spend hundreds of thousands of dollars to purchase, install, and maintain a device that complies with state and local requirements. In addition state and local governments purchase test equipment and employ expert weights and measures officials to ensure vehicle scales are maintained and used in compliance with legal requirements. For example, vehicle scales used commercially are required to be accurate to approximately ± 0.2 % of the actual weight a truck (e.g., 160 lb on an 80 000 lb truck). However, over the past few years, officials have grown increasingly concerned that a number of vehicle scale users rely on stored vehicle tare weights in commercial transactions that have been found to have errors of several thousand pounds. Stored vehicle tare weights are used in numerous weighing applications (e.g., solid waste disposal and landfills, quarries, mining, agriculture, household moving and other industries) where the net weight of commodities and charges for services are determined using vehicle scales. Surveys conducted in several jurisdictions have revealed that a majority of stored tare weights were inaccurate with errors ranging between ± 0.34 % to 22 % of the stored value. A large number of the tare errors were found to favor scale users.

Survey officials found that device users used a wide variety of approaches to determine when they would reweigh vehicles to obtain correct tare values. For example, some firms reweigh trucks once per day or week while others only determine stored tare values for the same vehicle once a month or once every few years. Several firms employed the preferred practice of weighing trucks in and out to provide the most accurate calculation of net weight while other firms used frequent reweighing of empty vehicles during the day to determine net weights (see Appendix B for more information).

The NWG agreed that survey results, which were collected over the last six years and indicated inaccuracies in stored vehicle tare weights, undermine the goal of scale users and weights and measures

¹ An example of a stored vehicle tare weight is one that is saved in computer memory and later recalled for use in commercial transactions to compute the net weight of the commodity contained in the vehicle (Gross Vehicle Wt. - Stored Vehicle Tare Wt. = Net Wt. of Commodity). Other types of "stored" vehicle tare includes those written or recorded on weigh tickets or maintained in tare charts or displayed on the vehicle for use to determine net weights.

² Sponsored by the U.S. Department of Commerce's National Institute of Standards and Technology; the National Conference on Weights and Measures and state and local weights and measures agencies.

officials to ensure that commercial vehicle scale weightings are accurate within the legal tolerances of approximately $\pm 0.2\%$.

II. Forum Activities

The forum was held at the Department of Commerce Headquarters in Washington D.C., on Tuesday, September 28, 2004. Attending were weights and measures officials from California, Indiana, Ohio, Maine, Maryland, Michigan, and New Mexico, along with representatives from UniGroup Inc., the Federal Highway Administration, Brechbuhler Scales Inc., Cardinal Scale Inc., and Rice Lake Weighing Systems Inc. See Appendix A for additional information on the participants.

The following presentations were given at the forum and are included in the Appendixes to this report.

- Ken Butcher, NIST Weights and Measures Division, gave a presentation on “The Use of Inaccurate Tare Weights in Vehicle Weighing.” The presentation included background information on NIST’s role in ensuring uniformity in weights and measures requirements and explained how the National Conference on Weights and Measures develops uniform laws, regulations and test procedures. The legal requirements that must be followed to maintain accurate weighing and measuring devices and current scale inspection procedures were also explained. The results from several state surveys of stored vehicle tare weights conducted at a variety of businesses were presented to show the impact of weighing errors. (See Appendix B.)
- Kathryn M. Dresser, NIST, Technical Advisor to the NCWM Laws and Regulations Committee, reviewed the history of the NCWM’s stored vehicle tare issue that was originally submitted for consideration by the State of Maryland through the Southern Weights and Measures Association in 1999 (see Appendix C).
- David Lazier, Branch Chief, State of California, Division of Measurement Standards, gave a presentation on his state’s Weighmaster Program and how it is used to ensure accurate weighing while allowing the use of several types of predetermined tare weights on a variety of containers and vehicles. (See Appendix D.)

III. Decisions and Future Activities

The NWG agreed to work together to achieve the following goals:

Goal 1: Increase Trade Association and Industry Participation

In spite of distributing the Forum announcement to the States, to more than 60 trade associations and other groups (e.g., local governments who may operate landfills), a news release, a Federal Register Notice, and mass emails, only a few industry and trade representatives expressed interest in participating in the forum. The NWG believes this lack of participation may have been a combination of affected parties not understanding the issue and the lack of enforcement by many states to ensure accurate vehicle tare weights (Lack of inspection staff and resources are the reasons most jurisdictions are unable to adequately supervise the use of stored vehicle tare weights.) The NWG agreed to make a concerted effort over the next year to reach out to users, trade associations and other interested parties to increase interest and participation in the effort to improve the accuracy of vehicle weighing.

Goal 2: Conduct a National Tare Survey in 2005-2006

The NWG decided that a National Tare Survey should be conducted in 2005-2006 because there is a lack of current data and questionable accuracy of some of the older data collected from business locations where the accuracy of the vehicle scale was not verified immediately prior to the verification of the stored tare weights. The new data will be collected for specific industries and weighing practices (see Appendix E for the draft of the survey form). The accuracy and integrity of the survey data will be established by ensuring that officials conducting surveys verify the accuracy of vehicle scales according to NIST Handbook 44 "Specifications, Tolerances and Other Technical Requirements for Weighing and Measuring Devices" immediately prior to verifying tare weights. Official will also conduct tare verifications following a uniform Examination Procedure Outline that the NWG will develop. NIST and one of the states participating in the NWG will co-sponsor a school for participating officials and NIST will provide technical assistance in collecting and evaluating the survey data to ensure that it meets the NWG's requirements. The NWG will provide periodic reports on its activities to the NCWM Laws and Regulations Committee.

Goal 3: The NWG will address issues and alternatives that should be considered in an effort to balance buyer and seller interests in the accuracy of these transactions. The NWG will provide an opportunity for industry representatives, consumers, vehicle scale-owner-users, exporters, importers, retailers, federal and state agencies, and other interested parties to learn how state and local weights and measures officials supervise the weighing of vehicles to ensure accuracy and equity in the marketplace.

Goal 4: The NWG will seek partners to identify concerns (e.g., economic impact of incorrect weights versus the time and investment of weighing vehicles for gross and tare weight) and solicit industry cooperation to reduce weighing inaccuracies through the identification and use of good weighing practices. Participation in the NWG is open to business, industry, consumers, trade associations, scale owners and users, state and federal officials, and other interested parties.

Goal 5: The NWG will solicit and share individual state experiences and enforcement approaches to resolving problems concerning stored vehicle tare weights and other weighing practices (e.g., split weighing) that may affect the accuracy of weighments.

Goal 6: The NWG will develop a guide on "Good Weighing Practices" to educate industry and other interested parties about state weights and measures supervision of vehicle weighing.

IV. Information and Invitation to Participate

If you would like to participate in this working group or would like to obtain additional information, please contact:

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**Appendix A. Participants List
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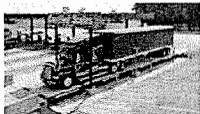
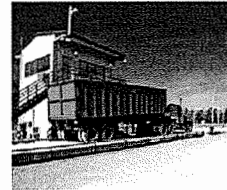
Appendix B.
Presentation on the Use of Inaccurate Tare Weights in Vehicle Weighing

Presentation begins on the following page.

The Use of Inaccurate Tare Weights in Vehicle Weighing



National Conference on Weights and Measures



Background

- The Roles of:
 - The National Conference on Weights and Measures
 - National Institute of Standards and Technology
 - State and Local Weights and Measures Officials

The National Conference on Weights and Measures

- A standards-development organization for weights and measures regulatory agencies of states, counties and cities as well as some Federal Departments.
- Also works with international legal metrology groups to foster uniformity in weights and measures requirements and to facilitate trade.

The purpose of the NCWM

- To bring together government officials, representatives of business, industry, trade associations and consumer organizations to hear and discuss subjects that relate to the weights and measures field.
- To develop and recommend laws and regulations, technical codes for weights and measures devices used in commerce, test methods, enforcement procedures and administrative guidelines.

NIST



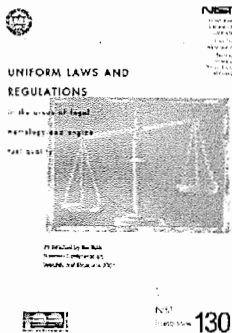
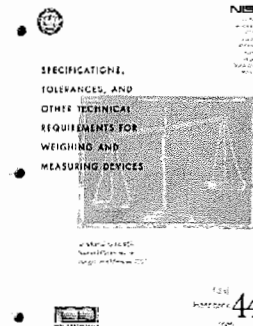
- Not a regulatory agency.
- 15 U.S. Code Chapter 7, Sec 272
 - (4) - Cooperate with the States in Securing Uniformity in Weights and Measures Laws and Methods of Inspection.
 - (10) Cooperate with other departments and agencies of the Federal Government, with industry, with State and local governments, with the governments of other nations and international organizations, and with private organizations in establishing standard practices, codes, specifications, and voluntary consensus standards.
 - (11) advise government and industry on scientific and technical problems.

State Role: Law Enforcement

- Commercial
 - buying or selling by weight or measure
 - service
 - transportation (freight, household moving).
 - storage, processing.
 - vehicle weighing service.
- Other
 - vehicle weights (total and axle loads)
 - statistical purposes

Basis of WM Inspection

- NIST Handbook 44 "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices."
- NIST Handbook 112 "Examination Procedures Outlines for Commercial Weighing and Measuring Devices"
- NIST Handbook 130 "Uniform Laws and Regulations..."



Weights and Measures Law

- 1.2. **Weight.** - The term "weight " as used in connection with any commodity or service means net weight.
- 1.10. **Net "Weight."** - ... means the weight of a commodity excluding any materials, substances, or items not considered to be part of the commodity.*

*Materials, substances, or items not considered to be part of the commodity include, but are not limited to, containers, conveyances, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accompaniments, and coupons, except that, depending on the type of service rendered, packaging materials may be considered to be part of the service (e.g., the service of shipping includes the weight of packing materials).

15. Misrepresentation of Quantity*

No person shall:

- sell, offer, or expose for sale a quantity less than the quantity represented, nor
- take more than the represented quantity when, as buyer, he/she furnishes the weight or measure by means of which the quantity is determined, nor
- represent the quantity in any manner calculated or tending to mislead or in any way deceive another person.

*The fact that a scale may overregister within established tolerances and is approved for commercial service is not a legal justification to deliver less than the stated quantity.

16. Misrepresentation of Pricing

- No person shall misrepresent the price of any commodity or service sold, offered, exposed, or advertised for sale by weight, measure, or count, nor represent the price in any manner calculated or tending to mislead or in any way deceive a person.

Most States adopt NIST Handbooks

- 41 States automatically adopt NIST Handbook 44
- All 50 states adopt some version of Handbook 44
- 46 States have adopted variations or sections of NIST Handbook 130, in particular, "The Uniform Packaging and Labeling Regulation"

Authority

- State laws and regulations give officials the authority to conduct inspections, conduct investigations and seek criminal or civil penalties.
- Most states adopt the handbooks either by reference or through their administrative procedure acts.
- All states set their own policies regarding frequency of inspection and enforcement actions.

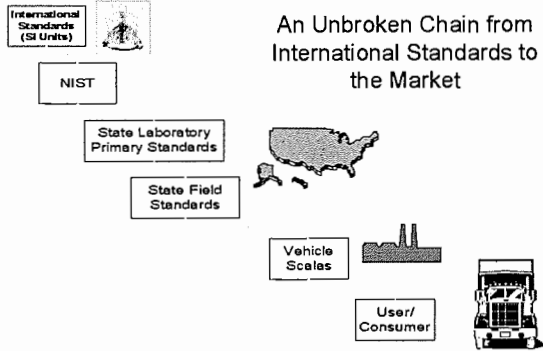
Purpose of Inspection

- Equity and fair competition
- Business and consumer protection
- Accurate: a scale is "accurate" when its performance ... its indications, its deliveries, its recorded representations, or its capacity or actual value, etc., as determined by tests made with suitable standards conforms to the standard within the applicable tolerances and other performance requirements. Scales that fail to conform are "inaccurate."

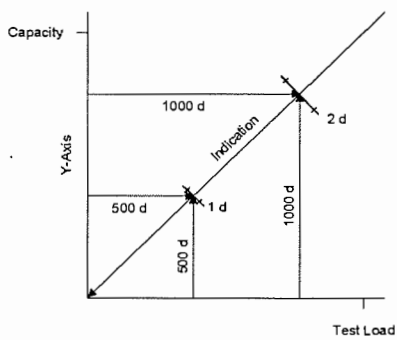
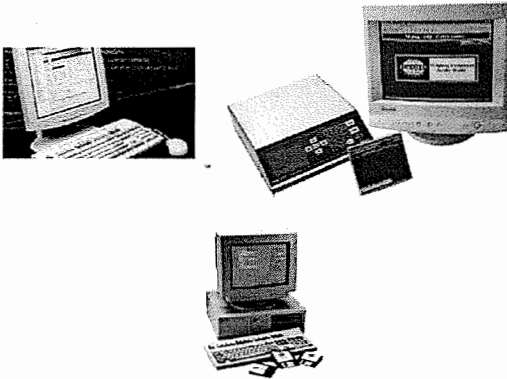
Laws

- Control commercial weighing and measuring instruments through:
 - Type Evaluation
 - Inspection and testing
- Enforce sale by net weight.
- Misrepresentation of weights and pricing.
- Prevent "misrepresentation" of weight caused by
 - apathy
 - accidental or intentional acts
 - ignorance

Measurement Traceability



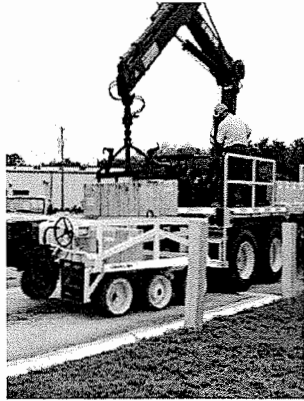
Overview: Typical Vehicle Scale Test Procedures Used by State Weights and Measures Officials



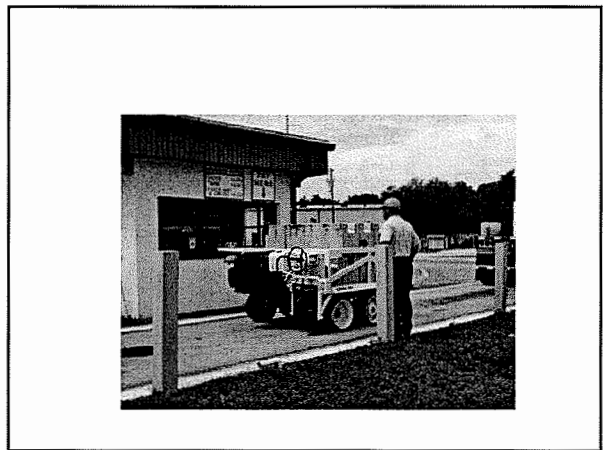
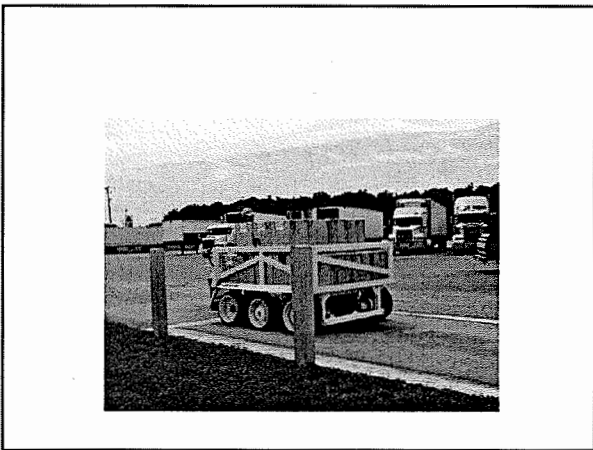
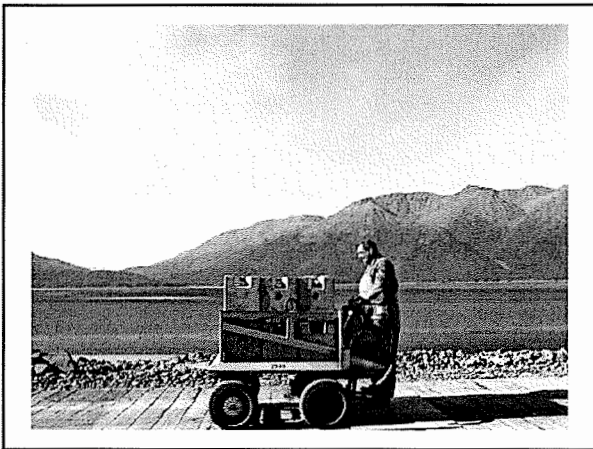
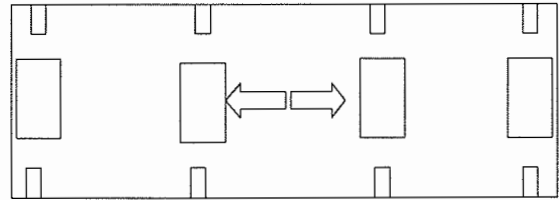
Examination Procedure Outline

- Zero
- Increasing load test (using 10,000 lb to 40,000 lb of known test weights)
- Shift test
- Decreasing load test (automatic scales only)
- Strain or substitution tests to verify higher scale capacities.
- Return to zero

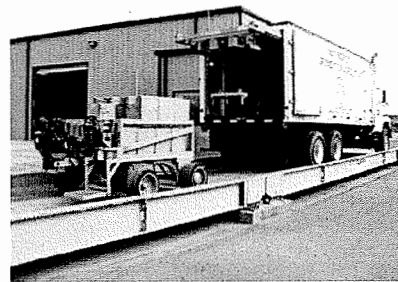
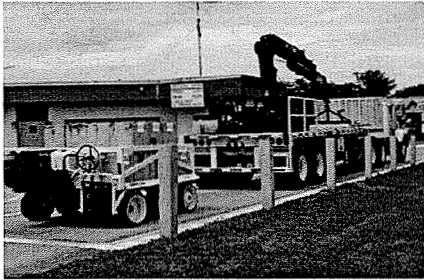
Zero Test
then
Increasing-
Load
Test



Directional Test Load Pattern -
(4) Section Scale



Strain Load Test



Evaluation of Test Results

- Tolerance results at all test loads
- Agreement of section test results
- Repeatability
- Return to zero
- Sensitivity at zero and maximum test load
- Compliance with other requirements such as overcapacity blanking and motion detection for printing.

Theory of Tolerances

- Tolerances:
 - are primarily accuracy criteria for use by regulatory officials.
 - values are fixed so the permissible errors are sufficiently small so that there is no serious injury to either buyer or seller of commodities or services.
 - Historically vehicle scale tolerances have been 0.1 % and 0.2 % of test load (i.e., 1 lb or 2 lb per thousand pounds of weight).

Scale Capacity 120,000 x 20 lb

+/- Acceptance	Load in lb	+/- Maintenance
10	0 to 10,000	20
20	20,000	40
30	30,000	60
40	40,000	80
50	50,000	100
60	60,000	120
70	70,000	140
80	80,000	160
90	90,000	180
100	100,000	200
110	110,000	220
120	120,000	240

Scale Capacity 200,000 x 50 lb

+/- Acceptance	Load in lb	+/- Maintenance
25	0 to 25,000	50
50	50,000	100
75	75,000	150
100	100,000	200
125	125,000	250
150	150,000	300
175	175,000	350
200	200,000	400
225	225,000	450
250	250,000	500
275	275,000	550
300	300,000	600

Stored Tare Weight Surveys

Definitions

- Gross Weight = truck + cargo
- Tare Weight = truck, driver, fuel and other.
- Net Weight = weight of the product, commodity or cargo carried.

How are weights used?

- Seller
 - Basis for buying and selling (+/- errors)
 - Services (freight, storage, weight for service)
 - Inventory
 - Highway weight limit compliance
- Commercial Transaction:
 - Seller to Buyer (single or multiple transactions)
 - Seller to Buyer and Third or Multiple Parties

Example of Tare Weight Error

Stored Tare Used for Trade: 33,140 lb

Actual Tare: 33,700 lb

Error: - 560 lb

Gross Wt: 50,000 lb

Gross Wt: 50,000 lb

False Tare: 33,140 lb

Actual Tare: 33,700 lb

False Net Weight: 16,860 lb

True Net Weight: 16,300 lb

Customer Shortweighed: 560 lb

Stored Tare

- Stored and recalled from memory in digital indicators and computers.
- Charts with truck-id and tare weight taped to the wall.
- Marked on vehicle or driver information.

What Changes Tare Weight?

- Driver/Passengers on-off truck
- Repairs or modifications to vehicle (e.g., new tires, paint, welding etc.)
- Tools, material handling equipment, personal effects.
- Fuel and other fluid levels.
- Mud, dirt and others (e.g., product retained in bed of dump truck).

States Reporting Survey Results

Across all Industries

- Arizona
- California
- Connecticut
- Florida
- Iowa
- Maryland
- Minnesota
- Nebraska
- Pennsylvania
- Tennessee
- Virginia
- West Virginia

Frequency of Tare Updates based on User Comments

- Yearly (but firm was using tare weights that were 3 years old).
- Tare weight established by 3 separate weighings is used.
- Only when customer requests.
- Monthly

- Once in every 10 weighings (3, 2, or 5)
- Every day or twice per day
- 2 years, 5-1/2 years (+ 860 lb)(+ 640 lb)
- Every 2 days
- Every 3 months
- Once per week, every two-weeks, year, and beginning of paving season
- Weigh-in and weigh-out
- Never

Survey Results

(tolerance allowed on at vehicle weights in parentheses)

- 26 locations
 - Errors: - 180 to + 570 (60 – 80 lb) [750]
- 183 tare weights
 - Errors: - 740 to + 400 lb (40 – 80 lb) [1140]
- 48 tare weights
 - Errors: -1300 to + 660 (20 – 80 lb) [1960]
- 140 tare weights
 - Errors: - 8900 to + 2340 (20 – 100 lb) [11240]

Survey Results

(tolerance allowed on at vehicle weights in parentheses)

- 8 tare weights
 - Errors: - 340 to + 300 (40 – 80 lb) [640]
- 39 tare weights
 - Errors: -1020 to + 680 lb (20 – 80 lb) [1700]
- 44 tare weights
 - Errors: -4920 to + 540 (60 – 80 lb) [5460]
- 113 tare weights
 - Errors: -4680 to + 1060 (20 – 80 lb) [5740]

Survey Results

(tolerance allowed on at vehicle weights in parentheses)

- 36 tare weights
 - Errors: - 320 to + 260 (40 – 60 lb) [640]
- 57 tare weights
 - Errors: -660 to + 2680 lb (20 – 100 lb) [3340]
- 84 tare weights
 - Errors: -480 to + 1200 (40 – 100 lb) [1680]

Individual Vehicles
(d-daily, 3 - 90 days, 1- yearly)

Used	Actual	Error	%
23,300	23,380	- 80	- 0.34
25,300	25,200	+100	+ 0.39
24,340	24,380	- 40	- 0.16
35,760	36,340	+ 580	+ 1.62
34,000	37,000	-3,000	- 8.82
33,500	34,440	- 940	- 2.80
34,600	32,260	+2,340	+ 6.76
42,360	45,500	-3,140	- 7.41
23,680	24,800	-1,120	- 4.72
27,500	30,900	-3,400	- 12.36

Individual Vehicles
(Largest Variations)

Used	Actual	Error	%
31,800	24,800	+ 7,000	+ 22 (quarry)
42,780	51,680	- 8,900	-20.8 (landfill)
28,760	33,680	- 4,920	-17 (aggregates)
42,360	45,500	- 3,140	- 7.4 (landfill)
27,500	30,900	- 3,400	- 12.3 (recycle)
34,600	32,260	+ 2,340	+ 6.7 (landfill)
27,380	28,680	-1,300	- 4.7 (different trailers)

Individual Vehicles
Daily - Quarry

Used	Actual	Error	%
23,300	23,380	- 80	- 0.34
23,200	23,140	+60	+ 0.25
23,520	23,500	+20	+ 0.08
24,340	24,380	- 40	- 0.16
23,300	23,320	- 20	- 0.08
26,100	26,140	- 40	- 0.16
23,180	23,200	- 20	- 0.08
24,820	24,780	+ 40	+ 0.16
25,300	25,200	+ 100	+ 0.39
22,800	22,820	- 20	- 0.08

Proposed Actions

- Coordinate a new survey to obtain current data on stored vehicle tare weights.
- Contact industry and trade associations and solicit their assistance in sharing survey results with their members so the economic impact of the errors is recognized and good weighing practices are initiated to correct weighing inaccuracies.

Proposed Actions

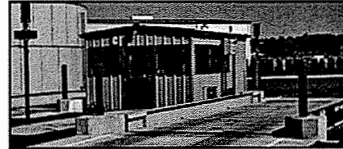
- Develop "Good Weighing Practice" guide for distribution to device owners-users.
- Educate W&M Officials about the problem and provide guidance on how they can control violations through supervision and enforcement action.
- Consider HB 44 & HB 130 proposals? (e.g., require stored vehicle tares to be deleted from memory each day ?)

Other Weighing Practices that Result in Inaccuracies

- Double-Draft or split-weighing:
Kansas recently found using the same truck that 100 % of the double-draft weights differed from the single-draft weights, and 73 % differed by an amount greater than the applicable 120 lb tolerance for the vehicle. The average plus error was 320 lb and the average minus error was 210 lb. Several errors exceeded 1,000 lb.



Agreement of Weigh-in & Weigh-out Scales



- Weigh-in and Weigh-out Scales are within tolerances but one is plus and other is minus (e.g., at 80,000 lb on a 20 lb division scale this difference could be as much as 320 lb)

Contact Information

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Appendix C. History of NCWM Stored Vehicle Tare Issue

In 1999 the State of Maryland submitted for consideration a proposal relating to the accuracy of stored vehicle tare weights to the Southern Weights and Measures Association (SWMA). The SWMA forwarded the item (as shown immediately below) to the National Conference on Weights and Measures Laws and Regulations Committee for review at its 2000 Interim Meeting

232-2 Stored Vehicle Tare Weights

SOURCE: Southern Weights and Measures Association (SWMA) from the State of Maryland.

CURRENT PROPOSAL: Add the following language to the Handbook 130, Method of Sale Regulation:

3.5. Vehicle Tare Weights - Whenever stored vehicle tare weights are employed, the following conditions and requirements shall apply:

3.5.1. All stored vehicle scale tare weights shall be determined to the nearest scale division. When stored tare weights are used, issued weight certificates shall identify that fact by placing words such as "stored tare" next to the tare weight. Abbreviations or symbols may be used, provided the terminology is defined elsewhere on the printed ticket.

3.5.2. Stored vehicle scale tare weights shall be verified at regular intervals at a frequency to be determined by the jurisdiction with statutory authority for the device, unless preempted by a more stringent guideline/requirement or modification of the vehicle.

BACKGROUND AND JUSTIFICATION: Stored vehicle tare weights are being used and have often been found to be incorrect. Errors found in initial vehicle tare weight surveys range from weighing 8,900 pounds less than the stored tare to weighing 2,680 pounds more than the stored tare. A load of sand or gravel at a cost of \$5.50 per ton with a tare error of 750 pounds has a monetary value for each weighing error of \$2.06. If this error occurs on four transactions per day for 240 working days, it results in an overcharge of more than \$1,977 per year. Since the practice of using stored tare weights is followed by other types of businesses (e.g., landfills and asphalt plants) where prices may reach \$70 or more per ton, an error of 750 pounds in the tare weight of a truck would equal \$26 per weighing. If this truck were involved in four transactions per day for 240 working days, the overcharge would total more than \$25,000 per year.

HISTORY OF ITEM: This item was originally submitted to the Committee by the SWMA in 1999 as:

1. Develop a method of sale regulation for stored vehicle tare weights. Require scale operators to maintain accurate and up to date tare weights. The SWMA submitted the following suggested requirements for a new method of sale.
 - 3.5. Vehicle Tare Weights - Whenever stored vehicle tare weights are employed, the following conditions and requirements shall apply:
 - 3.5.1. Allowable differences. - The difference between actual tare weight and stored tare weight must not exceed plus or minus 2 %.
 - 3.5.2. All stored vehicle scale tare weights shall be accurately determined to the nearest scale division.
 - 3.5.3. Stored vehicle scale tare weights shall be verified at regular intervals, not to exceed 3 months, unless pre-empted by a more stringent guideline/requirement.
2. Adopt appropriate allowable difference between actual tare weight and stored tare weight.
3. Develop an examination procedure outline and enforcement procedures.

4. Collect data from States that have not yet responded to a survey conducted by the States of Maryland and North Carolina.

In 2000:

At the January Interim Meeting the Committee received comments from the States of Maryland and Mississippi. Maryland requested that this item be maintained as developmental and suggested further study by the Southern Weights and Measures Association (SWMA). An official from the state of Mississippi testified that stored tare weights are illegal in that jurisdiction. The Committee decided to maintain this item as Developmental and asked that further work be done on a regional level to clarify this issue and fully develop the proposal.

- The Central Weights and Measures Association (CWMA) questioned the 600-lb tolerance. CWMA suggested that if a tolerance is to be allowed, it should be no greater than the maintenance tolerance for the tare weight.
- The Northeastern Weights and Measures Association (NEWMA) supported continuing development of this issue. NEWMA reported that, while some states already prohibit stored tares in present enforcement programs, many feared that the practice is fairly widespread. NEWMA was supportive of the concept of timely verification of stored tare weights, but NEWMA felt that the time limit and tolerance proposals were not acceptable. NEWMA also expressed concern that stored tare weights may be inconsistent with the provisions of the Uniform Weighmaster Law in that the tare weight was not actually measured by the Weighmaster and could invalidate any weight ticket issued.
- The Western Weights and Measures Association (WWMA) supported the further development of this item with the consideration of existing tare regulations in other states. WWMA also recommended consideration of the following:
 - Allowable differences should be a percentage of the weight of the vehicle as opposed to a fixed weight.
 - Limit the use of stored tare weights to specific commodities such as rock, sand or gravel.
 - Certified weight tickets must also include a disclosure that reflects the use of a stored tare weight.
 - Do not require a mandatory tare weight verification interval of 3 months.

In 2001:

The Committee made this item Informational and considered several comments from the regional associations, including: (1) Should the use of stored tare weights be limited to weighing in certain applications, such as quarries and landfills; (2) Would it be appropriate to develop a proposal for consideration by the National Conference on Weights and Measures Specifications and Tolerances Committee (S&T) to require disclosure on the weight ticket that stored tare weights were used in arriving at the net weights (as has been done with manual weight entries); (3) Would it be appropriate to remove the mandatory verification interval of three months because some jurisdictions may prefer to verify the accuracy of a stored tare weight at their leisure and not provide the operator with a time frame during which non-compliance may be permitted; (4) Is the 2 % tolerance too large – should it be limited to the absolute value of the maintenance tolerance for the value of the tare weight?

- The CWMA opposed this item, expressing concerns that it would create a tolerance for tare weights when accuracy was possible. CWMA had further concerns that this allowance would open the door for proliferation into other areas of measurement.
- The WWMA recommended that the item be amended to:

3.5. Vehicle Tare Weights - Whenever stored vehicle tare weights are employed for more than one weighment, the following conditions and requirements shall apply:

3.5.1. Allowable differences - It is the responsibility of the party for whom the stored tare weight was established to maintain the actual tare weight of the vehicle so that it at no time exceeds the stored tare weight.

3.5.2. All stored vehicle scale tare weights shall be accurately determined to the nearest scale division.

3.5.3. Weight certificates issued when stored vehicle tare weights are used shall identify that fact by placing the words "stored tare" next to the tare weight. The letters "ST" may be used in lieu of the words.

3.5.4. The use of stored vehicle tare weights shall be limited to vehicles moving earth, rock, sand, gravel, or asphalt paving material.

- The SWMA recommended that the item be amended to:

3.5. Vehicle Tare Weights - Whenever stored vehicle tare weights are employed, the following conditions and requirements shall apply:

3.5.1. Allowable differences - The difference between the actual tare weight and stored tare weight must not exceed plus or minus 3 scale divisions.

3.5.2. All stored vehicle scale tare weights shall be accurately determined to the nearest scale division. Weight certificates issued when stored vehicle scale tare weights are used shall identify that fact by placing words such as "stored tare" next to the tare weight. Abbreviations or symbols may be used provided the terminology is defined elsewhere on the printed ticket.

3.5.3. Stored vehicle scale tare weights shall be verified at regular intervals at a frequency to be determined by the jurisdiction with statutory authority for the device, unless preempted by a more stringent guideline/requirement or modification of the vehicle.

3.5.4. The use of stored vehicle scale tare weights shall be limited to vehicles moving earth, rock, gravel, refuse, coal, or asphalt paving material.

In 2002:

At the January Interim Meeting the Committee reviewed the information concerning this issue and decided to submit this item to the NCWM for a vote using the language originally proposed by the SWMA. The Committee learned from the USDA Packers & Stockyards Administration that if this proposal is to be applied to poultry that is weighed on a vehicle scale, a tolerance of 3 divisions (in the SWMA amended proposal) would conflict with their requirements. At the July Annual Meeting, this item went before the NCWM and did not receive enough votes to either pass or fail; it was returned to the Committee.

- The CWMA recommended that this item be withdrawn. CWMA is concerned that the item allows a tolerance for a weight that is (or can be) known. The State of Michigan presented an audit report of 77 vehicles weighed with stored tare weights:

Number of Trucks Weighed.....	77
Number of Stored Tares Found in Error	77
Percentage of Stored Tares in Error	100 %
Average Error "Stored Tare Weight"	988.3 lb
Number of Stored Tare Weights Favoring the Device Owner	34
Number of Stored Tare Weights Favoring the Customer.....	43
Total Error Weight Favoring the Device Owner.....	46,580 lb
Total Error Weight Favoring the Customer	32,500 lb
Economic Benefit to the Device Owner.....	14,080 lb
Estimated Annual Volume (Ton).....	4,400,000
Estimated Annual Sales	\$26,500,000
Average Estimated Number of Trucks Weighed: Company/Year	71,587

- The NEWMA opposed this item as written and recommended that it be amended to:

3.5. Vehicle Tare Weights - Whenever stored vehicle tare weights are employed, the following conditions and requirements shall apply:

3.5.1. All stored vehicle scale tare weights shall be determined to the nearest scale division. When stored tare weights are used, issued weight certificates shall identify that fact by placing words such as "stored tare" next

to the tare weight. Abbreviations or symbols may be used, provided the terminology is defined elsewhere on the printed ticket.

3.5.2. Stored vehicle scale tare weights shall be verified at regular intervals at a frequency to be determined by the jurisdiction with statutory authority for the device, unless preempted by a more stringent guideline/requirement or modification of the vehicle.

- The WWMA recommended that this item be withdrawn.
- The SWMA recommended that this item be withdrawn. SWMA recognized that stored tare weights are in use in all of the states and encouraged each jurisdiction to address these situations on a case-by-case basis.

In 2003:

At the January Interim Meeting the Committee decided to amend this item using language provided by the NEWMA and submitted it to the NCWM for a vote. The Committee received an additional proposal to amend this item as follows: In paragraph 3.5.1. in the first sentence, remove the word “determined” and replace it with “accurate”. The Committee decided to not make this amendment. At the July Annual Meeting, this item went before the NCWM and did not receive enough votes to either pass or fail; it was returned to the Committee.

- The CWMA recommended that this item be withdrawn and provided the following reasons: (1) Field data has revealed high errors; (2) Jurisdictions should not have to assume the responsibility of the user; (3) Non-uniformity of enforcement across jurisdictions; (4) Everyone should be enforcing net weight.
- The WWMA recommended that paragraph 3.5.1. of this item be amended to:

3.5.1. All stored vehicle scale tare weights shall be ~~determined~~ verified to the nearest scale division. When stored tare weights are used, issued weight certificates shall identify that fact by placing words such as “stored tare” next to the tare weight. Abbreviations or symbols may be used, provided the terminology is defined elsewhere on the printed ticket.
- The SWMA supported the change proposed by the WWMA.

Appendix D.
California Division of Measurement Standards Weighmaster Program

Presentation begins on the following page.

GA Weighmaster Program



C DFA
Division of Measurement Standards
Weighmaster/Petroleum Branch



David Lazier, Chief

(916) 229-3044 – dlazier@cdfa.ca.gov

ESTABLISHED TARE WEIGHTS

- *Common Tare Weights*
- *Average Tare Weights*
- *Predetermined Individual Tare Weights*
- *Seasonal Tare Weights*
- *Timber Tare Weights*

ESTABLISHED TARE WEIGHTS

The director shall adopt regulations for the establishment of vehicle, container, and pallet tares, including, but not limited to... the adoption of conditions of use

- *certificate requirements*
- *sample size*
- *allowable variations*
- *and procedures to verify*

ESTABLISHED TARE WEIGHTS

A weighmaster shall:

identify on a weighmaster certificate, the use of an established tare weight, following requirements specific to the type of established tare used.

Use of Established Tares

Identify on the weighmaster certificate

Common Tare	C.T.
Predetermined Tare(*except)	P.T.
Timber Tare	T.T.

**rock, sand, gravel, asphalt*

COMMON TARE WEIGHTS

ESTABLISHING:

1,000 lb or less

- *Uniform weight range (0.2 lb or 20 % variance between the highest and lowest)*
- *Minimum of 96 containers or 100% of the lot*
- *Round to nearest pound if greater than 30 lb; round to nearest 0.1 lb if 30 lb or less.*

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COMMON TARE WEIGHTS

PALLETIZED CONTAINERS

Containers per pallet	Min. Pallet Loads to be weighed
< 10	96 or 100% whichever is less
10 to 19	37 or 100% whichever is less
20 to 49	22 or 100% whichever is less
50 or more	11 or 100% whichever is less

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Understanding

Uniform Weight Range VS. Tolerance

Uniform weight range is the maximum allowable variation of weight from the average (mean) that any individual container in the lot may weigh

- For example:
- Average weight for lot was 100 lb
- 20% variation equals 20 lb
- Highest bin weight allowed would be 110 lb
- Lowest bin weight allowed would be 90 lb

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Understanding

Uniform Weight Range VS. Tolerance

- For example:
- Average weight for lot was 100 lb
- 20% variation equals 20 lb
- Highest bin weight allowed would be 110 lb
- Lowest bin weight allowed would be 90 lb

10

COMMON TARE WEIGHTS

•RESPONSIBILITY-

... "it is the responsibility of the party for whom the tare weight was established to maintain the tare weight within the variations prescribed by the director."

In no event shall tare weights exceed the tolerance level of 0.2 lb or 2 %, whichever is greater, of the established tare weight.

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Understanding

Uniform Weight Range VS. Tolerance

Tolerance for common tare weight is 2 % of the ESTABLISHED common tare weight

- For example:
 - Common tare weight for lot is 75 lb
 - 2% tolerance equals 1.5 lb
- No violation until common tare average weight for sample (96 or 100%) weighed exceeds 76.5 lb or is less than 73.5 lb

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Understanding Uniform Weight Range VS. Tolerance

Tolerance for common tare weight is 2 % of the **ESTABLISHED** common tare weight

13

Understanding Uniform Weight Range VS. Tolerance

- For example:
- Common tare weight for lot is 75 lb
- 2% tolerance equals 1.5 lb

No violation until common tare average weight for sample (96 or 100%) weighed exceeds 76.5 lb or is less than 73.5 lb

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COMMON TARE NOTICE

TO BE MAINTAINED AT EACH WEIGHING LOCATION USING THIS TARE. THE ACTUAL TARE SHALL NOT VARY FROM THE COMMON TARE BY MORE THAN TWO PERCENT (2%) EITHER UP OR DOWN, WHICHEVER IS GREATER.

CODE DESIGNATION CCG-B1 COMMON TARE WEIGHT 118.5 LB EFFECTIVE DATE 3/25/99

PRODUCTS CALIFORNIA CANNERS AND GROWERS (Mark) (008) 736-3431

Address 444 W. California St., P.O. Box 80093, Sacramento, CA 95826

Established by CA Cannery & Growers (Commodity) (008) 736-3431

Units of Tare 100 (Units) (008) 736-3431

Type of Tare Bin (Type) (008) 736-3431

X Bin (Type) (008) 736-3431

Other None (Type) (008) 736-3431

Container 2L High (Type) (008) 736-3431

Container Description 2 Liter High (Type) (008) 736-3431

Container Use and Maintenance 2 Liter High (Type) (008) 736-3431

Mark Cal Can

Commodity All Commodities

Storage Location(s) of Lot(s) Being Sampled California Canners and Growers P.O. Box 815 444 W. California St. (P.O. Box 80093) Sacramento, CA 95826 Total Number of Units 200

Number Weighed 100 (Type) (008) 736-3431

Total Container Weight 11,850 lbs. (Type) (008) 736-3431

Average Weight 118.5 lbs. (Type) (008) 736-3431

The original of this Common Tare Notice and the weighmaster certificate(s) issued to establish the common tare are to be mailed to the Division of Measurement Standards, 8516 Fairbridge Road, Suite K, Sacramento, California 95826, (916) 229-2060, within five (5) days.

Common Tare Notice

Original CTN and weighmaster certificates sent to the DMS within 5 days of establishment.

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COMMON TARE WEIGHTS

•RESPONSIBILITY-

... "it is the responsibility of the party for whom the tare weight was established to maintain the tare weight within the variations prescribed by the director."

In no event shall tare weights exceed the tolerance level of 0.2 lb or 2%, whichever is greater, of the established tare weight.

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Weighted at 1212 Pinal St. Pinal, CA 95712 808796007

COMMODITY CA Cannery & Growers

Lot(s) Being Sampled CA Cannery & Growers

Lot(s) Identification YC5764

REMARKS: To establish common tare for bins

UNITS: 100

Weight of the empty bins to be used for CTN calculation 25/99

Vehicle is part of the weighing to determine empty bin weight

Certificates for CTN

Only empty bins are weighed on the scale. Issue a "Tare Only" certificate for the CTN.

Weighted at 1212 Pinal St. Pinal, CA 95712 808796007

COMMODITY CA Cannery & Growers

Lot(s) Being Sampled CA Cannery & Growers

Lot(s) Identification YC5764

REMARKS: To establish common tare for bins

UNITS: 100

MARK: CAL CAN CCG-B-1

Signature Jim Dandy 3/25/99

Signature Jim Dandy 3/25/99

Weighted at 1212 Pinal St. Pinal, CA 95712 808796007

COMMODITY CA Cannery & Growers

Lot(s) Being Sampled CA Cannery & Growers

Lot(s) Identification YC5764

REMARKS: To establish common tare for bins

UNITS: 100

MARK: CAL CAN

Signature Jim Dandy 3/25/99

Signature Jim Dandy 3/25/99

11850 lbs/ 100 weighed = 118.5 avg

Commodity All Commodities

Storage Location(s) of Lot(s) Being Sampled California Canners and Growers P.O. Box 815 444 W. California St. (P.O. Box 80093) Sacramento, CA 95826 Total Number of Units 200

Number Weighed 100 (Type) (008) 736-3431

Total Container Weight 11,850 lbs. (Type) (008) 736-3431

Average Weight 118.5 lbs. (Type) (008) 736-3431

The original of this Common Tare Notice and the weighmaster certificate(s) issued to establish the common tare are to be mailed to the Division of Measurement Standards, 8516 Fairbridge Road, Suite K, Sacramento, California 95826, (916) 229-2060, within five (5) days.

16

Weighted = 111 Pounds
 210000 CA 95121
 CA Cannery & Growers
 CA Cannery & Growers
 empty bins 47x47x28
 LBS 16170
 GROSS 1185
 TARE 14320
 NET 0

COMMODITY
 empty bins 47x47x28

REMARKS: To establish common tare for bins
 UNITS: 100
 MARK: CAL CA
 Jim Dandy 3/25/99
 Jim Dandy 3/25/99

118.5 lbs. avg rounded = 119

COMMON TARE NOTICE

TO BE MAINTAINED AT EACH WEIGHING LOCATION USING THIS TARE. THE ACTUAL TARE SHALL NOT VARY FROM THIS COMMON TARE BY MORE THAN TWO-TENTH (0.2) POUND OR TWO PERCENT (2%), WHICHEVER IS GREATER.

CODE DESIGNATION CCQ-B-1 COMMON TARE WEIGHT 119 LBS.
 EFFECTIVE DATE 3/1/94

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USE

Unless a party having legal or financial interest in the transaction notifies the weighmaster prior to issuance of a certificate that a Common Tare Notice (CTN) shall not be used, a weighmaster may use a CTN if a copy of the CTN is on file.

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COMMON TARE NOTICE

TO BE MAINTAINED AT EACH WEIGHING LOCATION USING THIS TARE. THE ACTUAL TARE SHALL NOT VARY FROM THIS COMMON TARE BY MORE THAN TWO-TENTH (0.2) POUND OR TWO PERCENT (2%), WHICHEVER IS GREATER.

CODE DESIGNATION CCQ-B-1 COMMON TARE WEIGHT 119 LBS.

PROCESSOR/USER CALIFORNIA CANNERS AND GROWERS
 Address P.O. Box 70132, Sacramento, CA 95826
 Established by Weighmaster Certificate Number(s) 11111111111111111111
 Authority of Title 4, Division 9, Chapter 9, Article 3, Part 1

Type of Tare: Bin Drum Container
 Box Crate Pallet Other

Customer Description: Empty bins 47x47x28

Notes: CCQ-B-1

Capacity: All sizes

Storage Location(s) of Labels: 444 W. California St., Sacramento, CA 95826

Number Weighs: 100

Total Container Weight: 11852 lbs.

Average Weight: 118.5 lbs.

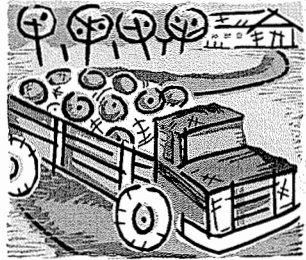
(609) 733-3995
 (Weighmaster Business Phone)

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- Maintain a copy of the completed CTN at all weighing locations where it will be used.
- A CTN can only be used by a licensed weighmaster at that location.

Average Tare

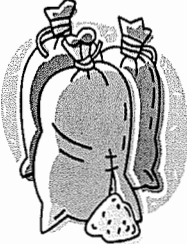
- Certificate issued will show the total number of containers, number of sample containers and the average weight
- Determined for each load at the time of certification
- Must meet uniform weight range conditions
- Cannot be used for subsequent loads



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Establishing

- Average tare weight will be determined mathematically (total weight divided by sample number) and rounded to the nearest 0.1 lb if equal to or less than 30 lb or the nearest pound if greater than 30 lb.
- Randomly select two (2) containers for the first fifty (50) in the lot and one (1) for each fifty (50) additional containers in the lot
- No less than three (3) containers weighed for a lot of 100 containers OR LESS



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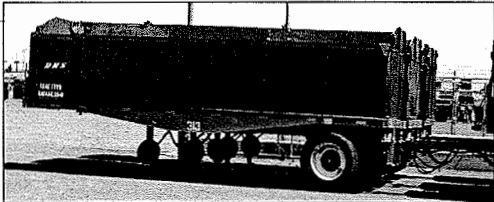
USE

Unless a party having legal or financial interest in the transaction notifies the weighmaster prior to issuance of a certificate that an average tare weight shall not be used, a weighmaster may use it.

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PREDETERMINED INDIVIDUAL TARE WEIGHT

The weight of a vehicle, container or pallet determined by a weighmaster prior to the time of delivery of a product; established and used in accordance with regulation and code.



ESTABLISHING A PREDETERMINED TARE

WEIGHMASTER CERTIFICATE

03967

To establish predetermined tare

VEHICLE	LBS	TARE ONLY
EMPTY FORD TRUCK	18,180	

Rocka R Us
1213 Stony Kat Dr.
Gravelert, CA 95555

Benny Rubble 2/2/2000

Fred Flint
1213 Stony Kat Dr.
Gravelert, CA 95555

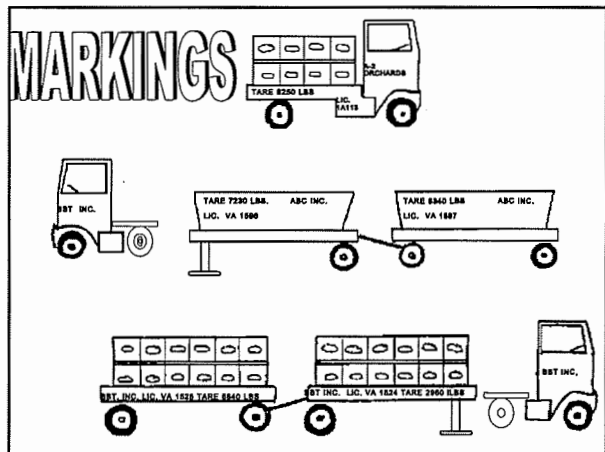
Rocka R Us
1213 Stony Kat Dr.
Gravelert, CA 95555

A copy should remain with the vehicle in case it is needed by another weighmaster.

(b) Each vehicle will be marked on both sides with:

- company name or code
- license number
- predetermined tare weight numbers and letters (not less than 3 inches in height, permanently marked on vehicle or placard). Gondola units will have required information applied to both sides of the container portion.

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(c) Each container or pallet that has a predetermined tare weight established shall be clearly marked on both sides with:

- company name or code
- company identification number
- predetermined tare weight numbers and letters (not less than 3 inches in height)

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USE

Unless a party having legal or financial interest in the transaction notifies the weighmaster prior to issuance of a certificate using a PT that a PT shall not be used. A weighmaster may use a PT if a TARE ONLY certificate is in his/her possession.

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USE

The weighmaster or contract hauler who uses a PT shall have in their possession a copy of the weighmaster certificate establishing the PT.

WEIGHMASTER CERTIFICATE

3KSA737 03867

To establish predetermined tare

EMPTY FORD TRUCK	LBS. TARE ONLY	18,180
------------------	----------------	--------

Barney Rubble 2' x 2000

Rocks R Us Fred Flint
1213 Sloney Rat Dr., Gravelert, CA 95555

•RESPONSIBILITY-

... "it is the responsibility of the party for whom the tare weight was established to maintain the tare weight within the variations prescribed by the director."

In no event shall tare weights exceed the tolerance level of 0.2 lb or 2%, whichever is greater, of the established tare weight.

PT: EXEMPTIONS FOR SPECIFIED ROCK PRODUCTS

The issuance of predetermined tare weights are exempt from the marking and "tare only" certificate provisions of the California Code of Regulations.

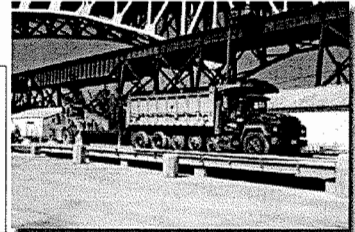


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PT: EXEMPTIONS FOR SPECIFIED ROCK PRODUCTS

Establishing:

•Should weigh the vehicle fully fueled and compartments empty. The driver may be on or off.

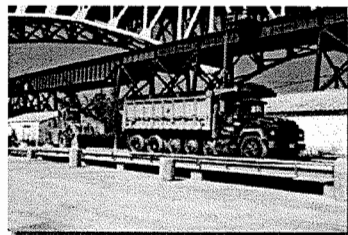


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PT: EXEMPTIONS FOR SPECIFIED ROCK PRODUCTS

Conditions of Use:

- The certificate must note if driver was on for both the gross and tare weight.
- Both the gross and tare weight must be determined with – driver on or off.



PT: EXEMPTIONS FOR SPECIFIED ROCK PRODUCTS

Recording:

•Weighmaster will maintain verifiable records of PTW and vehicle identification information; *electronic or hard copy.*

Conditions of use:

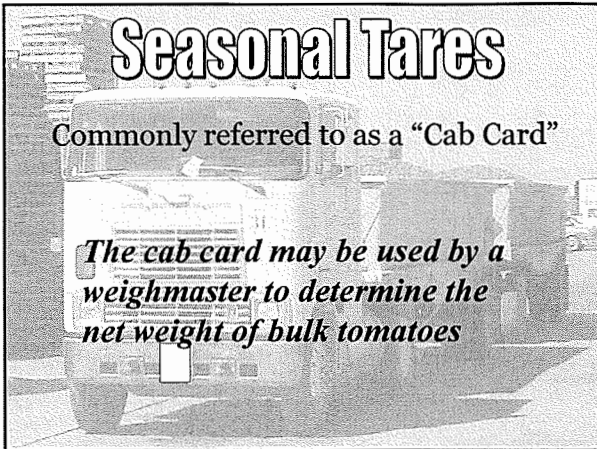
•At no time shall the actual weight of the vehicle exceed the recorded PT. The party for which the tare was established is responsible for maintaining the vehicle weight.

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Seasonal Tares

Commonly referred to as a "Cab Card"

The cab card may be used by a weighmaster to determine the net weight of bulk tomatoes



Conditions

- Only used for fuel consuming vehicles transporting bulk tomatoes.
- Valid for only one harvest season.
- Must be kept in the vehicle for which it was established.
- Must be submitted to the weighmaster to certify the net load.

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When Not To Use

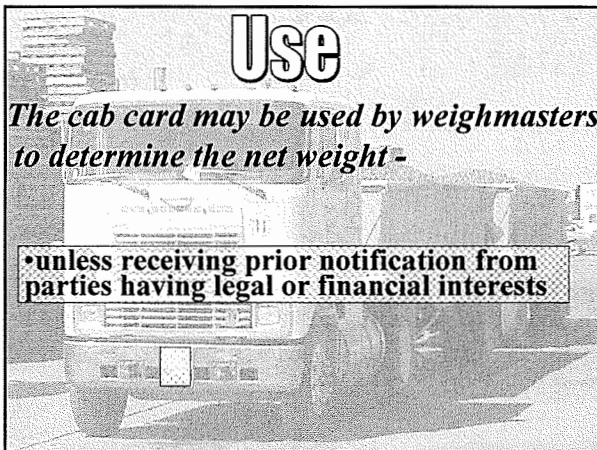
- If vehicle tare varies by more than 300 lb from established seasonal tare.
- If cab card weight figures have been changed or altered in any manner.
- When the weight or vehicle identification information on the cab card changes

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Use

The cab card may be used by weighmasters to determine the net weight -

- unless receiving prior notification from parties having legal or financial interests



Certificate for Cab Card

no: 121212

Truck License: 9A97287

Trailer License: /

Trailer License: /

Weighted For: FRANKLIN TRUCKING

Address: 2222 West Marlann-Road, Davis, CA

Delivered To: _____

Commodity: EMPTY 95 FORD C49 TRUCK Carrier: _____

Units: _____ Type: _____ Mark: _____ DCAC:

Disconnecting fuel lines is NOT acceptable for disabling fuel tanks. The tank must be REMOVED or SEALED in a tamper-proof manner.

Gross: _____

Tare: _____ Deputy: _____

WEIGHMASTER CERTIFICATE

WEIGHMASTER: _____ NET: _____


12470 East Lake Road
Davis, CA 95237

THIS IS TO CERTIFY that the following described commodity was weighed, measured, or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professions Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE
DIVISION OF MEASUREMENT STANDARDS
TRUCK TRACTOR TARE WEIGHT - BULK

VALID 2001 ONLY 4118 MULTROSE ROAD, STE. K

Official Tare Weight is 250 lb less than the certified weight.

OWNER/LESSEE Del Conte, Inc.	NAME Ford	COLOR Blue
NAME OF PRINCIPAL INSURER Relay Title Entity	<small>FAILURE TO MAINTAIN THE FUEL LEVEL MAY RESULT IN UNLAWFUL WEIGHT BEING LEANED FROM THE MANDATORY VEHICLE WEIGHT ALLOWANCE.</small>	
ADDRESS OF BUSINESS LOCATION 12740 East Lake Road	<small>OFFICIAL TARE WEIGHT</small> 	
CITY Davis	STATE CA	ZIP 95237
CERTIFICATE NUMBER 121212	DATE 5/25/01	CERTIFIED WEIGHT (OFFICIAL TARE WEIGHT) 12850 LBS.
BY Joe Schmo	DEPUTY	OFFICIAL TARE WEIGHT 12600 LBS.

THIS OFFICIAL TARE WEIGHT MAY BE USED WHEN TRANSPORTING BULK TOMATOES.

THE CARRIER AND/OR DRIVER OF THIS VEHICLE ARE RESPONSIBLE FOR MAINTAINING THIS VEHICLE'S WEIGHT WITHIN THE PRESCRIBED TOLERANCE OF THE OFFICIAL TARE WEIGHT WHEN THIS CAB CARD IS PRESENTED TO A WEIGHMASTER. FAILURE TO MAINTAIN THIS VEHICLE'S OFFICIAL TARE WEIGHT MAY RESULT IN PROSECUTION.

Fill out the Cab Card using information from the weighmaster certificate and the driver.


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Timber Tare Weights

Established on unladen log hauling trucks and used to determine net weight of logs weighed at a saw mill using an automated weight scaling program.

Net weight converted to board foot volume

Average of last five actual tare weights - based on sample scale frequency



PENALTIES

Common Tare Weight	}	Misdemeanors
Average Tare Weight		Up to \$1,000 + court costs (approx. 170%)
Predetermined Individual Tare Weight		And/or 6 months jail
Timber Tare Weight		
Seasonal Tare Weights		Infractions
		\$200 - \$800 + court costs (approx. 170%)
		No jail

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Appendix E. Draft Survey Form

Jurisdiction:					Date:	
How frequently does the firm reweigh stored tares?						
Type of Business:						
Business Name and Location:						
Vehicle Scale Tested Prior to Tare Verification? <small>(Yes or No, Please attach report)</small>						
Estimated Number of Vehicles Weighed Daily:						
Examples of Commodity or Services <small>(based on scale weights)</small>				Value of Commodity or Service <small>(e.g., price per ton or other unit).</small>		
a.						
b.						
c.						
	A. Identity of Vehicle <small>(e.g., user's ID or Truck Number)</small>	B. Type of Vehicle <small>(e.g., tractor-trailer, dump truck or other)</small>	C. Stored Tare Weight of Vehicle <small>(lb or ton)</small>	D. Tare Weight of the Vehicle <small>(lb or ton)</small>	Error in Pounds (C- D) <small>+/-</small>	Remarks
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
Official Conducting Survey:					Date	

Examples of the Type of Information that will be reported.

- Number of Jurisdictions Participating
- Number/Type of Businesses Survey.....
- Types of Commodities or Services Involved.....
- Number of Vehicles Weighed
- Number of Stored Vehicle Tares Found in Error
- Percentage of Stored Tares in Error
- Average Error "Stored Tare Weight"
- Number of Stored Tare Weights Favoring Device Users
- Number of Stored Tare Weights Favoring Consumers.....
- Total Error (Weight) Favoring the Device Owner.....
- Total Error (Weight) Favoring the Customer
- Estimated Economic Benefit to Device Users
- Estimated Annual Volume (Tons).....
- Estimated Annual Sales
- Estimated Number of Trucks Weighed Annually.....
- Frequency of Vehicle Tare Determination
- Types of Stored Vehicle Tare Identified

Appendix F. Money Value of Scale Divisions

Money Value of Scale Divisions														
Price Per Ton														
	\$5	\$10	\$15	\$20	\$25	\$30	\$40	\$50	\$70	\$80	\$90	\$100	\$150	\$200
10	0.025	\$0.05	\$0.08	\$0.10	\$0.13	\$0.15	\$0.20	\$0.25	\$0.35	\$0.40	\$0.45	\$0.50	\$0.75	\$1.00
20	0.05	\$0.10	\$0.15	\$0.20	\$0.25	\$0.30	\$0.40	\$0.50	\$0.70	\$0.80	\$0.90	\$1.00	\$1.50	\$2.00
50	0.125	\$0.25	\$0.38	\$0.50	\$0.63	\$0.75	\$1.00	\$1.25	\$1.75	\$2.00	\$2.25	\$2.50	\$3.75	\$5.00
100	0.25	\$0.50	\$0.75	\$1.00	\$1.25	\$1.50	\$2.00	\$2.50	\$3.50	\$4.00	\$4.50	\$5.00	\$7.50	\$10.00
Money Value of Scale and Tare Errors														
10	\$0.03	\$0.05	\$0.08	\$0.10	\$0.13	\$0.15	\$0.20	\$0.25	\$0.35	\$0.40	\$0.45	\$0.50	\$0.75	\$1.00
20	\$0.05	\$0.10	\$0.15	\$0.20	\$0.25	\$0.30	\$0.40	\$0.50	\$0.70	\$0.80	\$0.90	\$1.00	\$1.50	\$2.00
40	\$0.10	\$0.20	\$0.30	\$0.40	\$0.50	\$0.60	\$0.80	\$1.00	\$1.40	\$1.60	\$1.80	\$2.00	\$3.00	\$4.00
60	\$0.15	\$0.30	\$0.45	\$0.60	\$0.75	\$0.90	\$1.20	\$1.50	\$2.10	\$2.40	\$2.70	\$3.00	\$4.50	\$6.00
80	\$0.20	\$0.40	\$0.60	\$0.80	\$1.00	\$1.20	\$1.60	\$2.00	\$2.80	\$3.20	\$3.60	\$4.00	\$6.00	\$8.00
100	\$0.25	\$0.50	\$0.75	\$1.00	\$1.25	\$1.50	\$2.00	\$2.50	\$3.50	\$4.00	\$4.50	\$5.00	\$7.50	\$10.00
120	\$0.30	\$0.60	\$0.90	\$1.20	\$1.50	\$1.80	\$2.40	\$3.00	\$4.20	\$4.80	\$5.40	\$6.00	\$9.00	\$12.00
140	\$0.35	\$0.70	\$1.05	\$1.40	\$1.75	\$2.10	\$2.80	\$3.50	\$4.90	\$5.60	\$6.30	\$7.00	\$10.50	\$14.00
160	\$0.40	\$0.80	\$1.20	\$1.60	\$2.00	\$2.40	\$3.20	\$4.00	\$5.60	\$6.40	\$7.20	\$8.00	\$12.00	\$16.00
180	\$0.45	\$0.90	\$1.35	\$1.80	\$2.25	\$2.70	\$3.60	\$4.50	\$6.30	\$7.20	\$8.10	\$9.00	\$13.50	\$18.00
200	\$0.50	\$1.00	\$1.50	\$2.00	\$2.50	\$3.00	\$4.00	\$5.00	\$7.00	\$8.00	\$9.00	\$10.00	\$15.00	\$20.00
220	\$0.55	\$1.10	\$1.65	\$2.20	\$2.75	\$3.30	\$4.40	\$5.50	\$7.70	\$8.80	\$9.90	\$11.00	\$16.50	\$22.00
240	\$0.60	\$1.20	\$1.80	\$2.40	\$3.00	\$3.60	\$4.80	\$6.00	\$8.40	\$9.60	\$10.80	\$12.00	\$18.00	\$24.00
260	\$0.65	\$1.30	\$1.95	\$2.60	\$3.25	\$3.90	\$5.20	\$6.50	\$9.10	\$10.40	\$11.70	\$13.00	\$19.50	\$26.00
280	\$0.70	\$1.40	\$2.10	\$2.80	\$3.50	\$4.20	\$5.60	\$7.00	\$9.80	\$11.20	\$12.60	\$14.00	\$21.00	\$28.00
300	\$0.75	\$1.50	\$2.25	\$3.00	\$3.75	\$4.50	\$6.00	\$7.50	\$10.50	\$12.00	\$13.50	\$15.00	\$22.50	\$30.00
400	\$1.00	\$2.00	\$3.00	\$4.00	\$5.00	\$6.00	\$8.00	\$10.00	\$14.00	\$16.00	\$18.00	\$20.00	\$30.00	\$40.00
450	\$1.13	\$2.25	\$3.38	\$4.50	\$5.63	\$6.75	\$9.00	\$11.25	\$15.75	\$18.00	\$20.25	\$22.50	\$33.75	\$45.00
500	\$1.25	\$2.50	\$3.75	\$5.00	\$6.25	\$7.50	\$10.00	\$12.50	\$17.50	\$20.00	\$22.50	\$25.00	\$37.50	\$50.00
550	\$1.38	\$2.75	\$4.13	\$5.50	\$6.88	\$8.25	\$11.00	\$13.75	\$19.25	\$22.00	\$24.75	\$27.50	\$41.25	\$55.00
600	\$1.50	\$3.00	\$4.50	\$6.00	\$7.50	\$9.00	\$12.00	\$15.00	\$21.00	\$24.00	\$27.00	\$30.00	\$45.00	\$60.00
650	\$1.63	\$3.25	\$4.88	\$6.50	\$8.13	\$9.75	\$13.00	\$16.25	\$22.75	\$26.00	\$29.25	\$32.50	\$48.75	\$65.00
700	\$1.75	\$3.50	\$5.25	\$7.00	\$8.75	\$10.50	\$14.00	\$17.50	\$24.50	\$28.00	\$31.50	\$35.00	\$52.50	\$70.00
800	\$2.00	\$4.00	\$6.00	\$8.00	\$10.00	\$12.00	\$16.00	\$20.00	\$28.00	\$32.00	\$36.00	\$40.00	\$60.00	\$80.00
900	\$2.25	\$4.50	\$6.75	\$9.00	\$11.25	\$13.50	\$18.00	\$22.50	\$31.50	\$36.00	\$40.50	\$45.00	\$67.50	\$90.00
1000	\$2.50	\$5.00	\$7.50	\$10.00	\$12.50	\$15.00	\$20.00	\$25.00	\$35.00	\$40.00	\$45.00	\$50.00	\$75.00	\$100.00
1100	\$2.75	\$5.50	\$8.25	\$11.00	\$13.75	\$16.50	\$22.00	\$27.50	\$38.50	\$44.00	\$49.50	\$55.00	\$82.50	\$110.00
1200	\$3.00	\$6.00	\$9.00	\$12.00	\$15.00	\$18.00	\$24.00	\$30.00	\$42.00	\$48.00	\$54.00	\$60.00	\$90.00	\$120.00
1300	\$3.25	\$6.50	\$9.75	\$13.00	\$16.25	\$19.50	\$26.00	\$32.50	\$45.50	\$52.00	\$58.50	\$65.00	\$97.50	\$130.00
1400	\$3.50	\$7.00	\$10.50	\$14.00	\$17.50	\$21.00	\$28.00	\$35.00	\$49.00	\$56.00	\$63.00	\$70.00	\$105.00	\$140.00
1500	\$3.75	\$7.50	\$11.25	\$15.00	\$18.75	\$22.50	\$30.00	\$37.50	\$52.50	\$60.00	\$67.50	\$75.00	\$112.50	\$150.00
2000	\$5.00	\$10.00	\$15.00	\$20.00	\$25.00	\$30.00	\$40.00	\$50.00	\$70.00	\$80.00	\$90.00	\$100.00	\$150.00	\$200.00

Appendix G. Vehicle Scale Tolerances

Scale Division in Pounds

N.1.9 Zero	Test Load in d	Main. Tol in d	Accp. Tol in d	10		20		50		100		200		500		
				Accep.	Test Load in Pounds	Maint.	Test Load in Pounds	Accep.	Test Load in Pounds	Maint.	Test Load in Pounds	Accep.	Test Load in Pounds	Maint.	Test Load in Pounds	Accep.
	0	1	0.5	5	0	10	0	10	0	20	0	20	0	25	0	50
	0 to 500	1	0.5	5	5000	10	10000	10	10000	20	25000	20	25000	25	25000	50
	501 to 1000	2	1	10	10000	20	20000	20	20000	40	50000	40	50000	50	50000	100
	1001 to 1500	3	1.5	15	15000	30	30000	30	30000	60	75000	60	75000	75	75000	150
	1501 to 2000	4	2	20	20000	40	40000	40	40000	80	100000	80	100000	100	100000	200
	2001 to 2500	5	2.5	25	25000	50	50000	50	50000	100	125000	100	125000	125	125000	250
	2501 to 3000	6	3	30	30000	60	60000	60	60000	120	150000	120	150000	150	150000	300
	3001 to 3500	7	3.5	35	35000	70	70000	70	70000	140	175000	140	175000	175	175000	350
	3501 to 4000	8	4	40	40000	80	80000	80	80000	160	200000	160	200000	200	200000	400
	4001 to 4500	9	4.5	45	45000	90	90000	90	90000	180	225000	180	225000	225	225000	450
	4501 to 5000	10	5	50	50000	100	100000	100	100000	200	250000	200	250000	250	250000	500
	5001 to 5500	11	5.5	55	55000	110	110000	110	110000	220	275000	220	275000	275	275000	550
	5501 to 6000	12	6	60	60000	120	120000	120	120000	240	300000	240	300000	300	300000	600
	6001 to 6500	13	6.5	65	65000	130	130000	130	130000	260	325000	260	325000	325	325000	650
	6501 to 7000	14	7	70	70000	140	140000	140	140000	280	350000	280	350000	350	350000	700
	7001 to 7500	15	7.5	75	75000	150	150000	150	150000	300	375000	300	375000	375	375000	750
	7501 to 8000	16	8	80	80000	160	160000	160	160000	320	400000	320	400000	400	400000	800
	8001 to 8500	17	8.5	85	85000	170	170000	170	170000	340	425000	340	425000	425	425000	850
	8501 to 9000	18	9	90	90000	180	180000	180	180000	360	450000	360	450000	450	450000	900
	9001 to 9500	19	9.5	95	95000	190	190000	190	190000	380	475000	380	475000	475	475000	950
	9501 to 10000	20	10	100	100000	200	200000	200	200000	400	500000	400	500000	500	500000	1000

1. Tolerances

T.N.2.1. - Values are plus and minus unless otherwise specified.

T.N.3.1. - Maintenance Tolerances are based on Table 6

T.N.3.2. - Acceptance Tolerances are one-half the maintenance tolerances in Table 6

T.N.4.4. - Range of results from section tests shall not exceed the absolute value of maintenance tolerance (e.g., 20 lb not +/- 20)

T.N.5. - The range of results from several weighings of the same load under reasonably static test conditions must agree within the absolute value of the maintenance tolerance (e.g., 20 not +/- 20). Applies even when acceptance tolerances are used.

N.1.9. Zero Load Balance Change - the zero load shall not change by more than the minimum tolerance applicable to the scale.

S.5. Accuracy Class - III L devices must have: (1) d equal to or greater than 5 lb, (2) at least 2000 d but not more than 10000.

Table 6. Maintenance Tolerances in Scale Divisions

Tolerances	1	2
III L	0 to 500	501 to 1000
	Add 1 d for each additional 500 d of test load or fraction thereof	
	For test loads greater than 1000 d	