Report of the

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Report Editors: Albert D. Tholen
Carroll S. Brickenkamp
Ann H. Turner

U.S. Department of Commerce
Robert A. Mosbacher, Secretary

National Institute of Standards and Technology
John W. Lyons, Director

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320-11 V T.N.1. Principles; Multiple-Weighing Devices Interfaced with a Single Indicator

(This item was adopted.)

Discussion. The number of vehicle scales consisting of three or more individual weighing elements used simultaneously to obtain a gross weight for commercial transactions is increasing. The individual weighing elements are used to obtain axle-load weights to determine compliance with highway laws and, because the entire vehicle is weighed as a single draft, the summed weight may be used for commercial transactions. The classification of the system as a single scale would mean that the entire system shall not exceed the maximum number of scale divisions for the application. A vehicle scale consisting of three weighing devices would then also have to meet T.N.4.4. across all of the sections.

This approach to weighing has raised the question of how the number of scale divisions permitted in class III or III L scales should be applied. For example, a vehicle scale may have three platforms with the following capacities: 100,000 x 20 lb, 100,000 x 20 lb, and 60,000 x 20 lb. The sum of these scale capacities is 260,000 lb for a total of 13,000 divisions. Should the maximum number of divisions for class III scales apply to the summed indication? An argument can be made that the total is ouly the sum of digital indications, hence the 10,000 division limitation should not apply. However, a request had been received to permit four 20,000-lb x 5-lb capacity scales to be used in combination to provide a scale with a capacity of 80,000 x 5 lb, essentially to circumvent the class III L limit on the number of scale divisions. Consequently, the 10,000-division limit should apply to the summed indication, which is being used as the basis for commercial trade.

There is a similar situation in railroad weighing when rail cars are weighed in motion in multiple drafts. Each set of axles is weighed separately and combined to obtain the total weight of the car. It is the industry practice and the position of the Office of Weights and Measures that the capacity of the scale is the summed total of the anticipated maximum weights of the axles of the rail cars intended to be weighed on the scale. The 10,000 division limitation applies to the capacity rating of the scale although the static weighing capacity of the scale is a fraction (usually one-half) of the capacity rating of the scale.

Committee Recommendation: Multiple weighing elements (e.g., three axle-load scales permanently installed adjacent to one another or with a dead space between the weighing elements) used simultaneously to obtain a single weight in commercial applications shall be deemed to be a single system which shall meet the requirements of the applicable accuracy class.

The classification of a scale or weighing system into an accuracy class should be based upon its application and method of use, not on the design of the device. Although this item does not contain a recommendation for change to Handbook 44, this interpretation is presented to the Conference for a vote to obtain a clear statement of the requirements that are to apply to these weighing systems. The Committee is aware that a number of jurisdictions test each scale as an independent scale, not as a single weighing system. The significance of this interpretation is that not ouly must each independent weighing device meet the requirements of Handbook 44, but the entire weighing system must meet all requirements that would apply if the device were a single scale.

Note page 158 contains a table from item 320-10

The Committee recommends that the following criteria be applied to multiple-weighing devices interfaced with a single indicating element:

1. The number of divisions in the weight indicator displaying the summed weight of all weighing elements of a scale consisting of multiple weighing elements (weighing simultaneously) shall not exceed the maximum permitted for the accuracy class (10,000 for class III and III L). The capacity by division must be marked on the weight display of the summing indicator.

2. Separate weight displays for individual weighing elements must have separate capacity statements. The number of divisions for each weighing element must satisfy the requirement for the number of scale divisions for the accuracy class. The scale division values for each weighing element and the weight display that is summing the weight values must be the same.

3. The capacity of the summed weight display shall not exceed the sum of the capacities of the individual weighing elements.

4. If one weighing element is overloaded and blanks out, then the summing weight display must also blank out.

5. All scale sections in the multiple weighing elements used simultaneously must agree within the absolute value of the maintenance tolerances (T.N.4.4.) as if the scale had a single weighing element.

Multiple weighing devices that are independent and used separately to weigh components that are mixed to obtain a final product shall be treated as separate scales, and each scale must meet the requirements of the applicable accuracy class.

[Editor's Note: The failure to reference specific paragraphs as a basis for these interpretations was identified as a deficiency in this item. For reference purposes, the applicable paragraphs are General Code G-S.1. Identification; G-S.5.2.2. Digital Indication and Representation; Scales Code S.1.7. Capacity Indication, Weight Ranges, and Unit Weights; S.5. Design of Weighing Devices, Accuracy Class; Table 3; T.N.1. Principles; and T.N.4.4. Shift or Section Tests.]