



Examination Procedure Outlines (EPOs) for Commercial Weighing and Measuring Devices

EPO No. 14

Belt-Conveyor Scale Systems

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EPO No. 14
NIST Examination Procedure Outline (EPO) for
Belt-Conveyor Scale Systems

1. Scope.

It is recommended this outline be followed as minimum criteria for examining belt-conveyor scale systems. Nonretroactive requirements are followed by the applicable date in parentheses.

2. Safety Notes.

When excerpting this Examination Procedure Outline for duplication, the "Safety Considerations" section and the "Glossary of Safety Key Phrases" should be duplicated and included with the outline.

Safety policies and regulations vary among jurisdictions. It is essential that inspectors or servicepersons be aware of all safety regulations and policies in place at the inspection site and to practice their employer's safety policies. The safety reminders included in this EPO contain general guidelines useful in alerting inspectors and servicepersons to the importance of taking adequate precautions to avoid personal injury. These guidelines can only be effective in improving safety when coupled with training in hazard recognition and control.

Prior to beginning any inspection, the inspector should read and be familiar with the EPO Safety Annex - "Safety Considerations and Glossary of Safety Key Phrases." The terms and key phrases in each safety reminder of this outline are found in the glossary of the EPO Safety Annex. The inspector is reminded of the importance of evaluating potential safety hazards prior to an inspection and taking adequate precautions to avoid personal injury or damage to the device. As a minimum, the following safety precautions should be noted and followed during the inspection:

- **Clothing**
- **Electrical Hazards**
- **Eye Protection**
- **Fire Extinguisher**
- **First Aid Kit**
- **Lifting**
- **Location Nature of Product**
- **Personal Protection Equipment**
 - e.g., Safety Shoes, Aprons, Respirators, Gloves, Barrier Cream, etc., if deemed necessary. Hard Hat – for protection from overhang in rear of vehicle-tank trucks.
- **Safety Data Sheet (SDS)**
- **Safety Cones/Warning Signs/Other Types of Barriers**
- **Transportation of Equipment**
- **Weather**

Also:

- **Wet and Slick Conditions**
- **Hazardous Materials**
- **Traffic**
- **Obstructions and**

- **Overhead Hazards**

SAFETY REMINDER!!!

- **Check the inspection site carefully for safety hazards and take appropriate precautions.**
- **Learn the nature of hazardous products used at or near the inspection site.**
- **Use caution while moving in wet, slippery areas.**
- **Use personal protection equipment appropriate for the inspection site.**
- **Be sure a first aid kit is available and the kit is appropriate for the type of inspection activity.**

3. Inspection.

NOTE: Code references used throughout the document are drawn from NIST Handbook (HB) 44 General Code (Section 1.10) and Belt-Conveyor Scale Systems Code (Section 2.21). The relevant code section(s) is cited by its numerical designation and the applicable requirement(s) from that code section is identified by letter-number designation only. The code section and paragraph designation(s) are then shown immediately after the corresponding line item or task listed in the procedure. For example, NIST HB 44 General Code (Section 1.10) is designated as “1.10:” followed by the paragraph designation(s) relevant to the line item. Nonretroactive requirements are followed by the applicable date in parentheses.

3.1. Accessibility and Assistance in Inspecting, Testing, and Sealing.

Device must be readily accessible for purposes of testing. Assistance shall be provided by the firm if access to weighing elements is needed.

Code Reference: 1.10: G-UR.2.3., G-UR.4.4.

A belt-conveyor scale manufactured after January 1, 1981 shall be installed so that material tests can be conveniently conducted.

Code Reference: 2.21: UR.1.3.

Retention of Maintenance, Test, and Analog or Digital Recorder Information.

Code Reference: 2.21: UR.2.6.

Notification of compliance.

Code Reference: 2.21: UR.4.

3.2. Material Handling.

Code Reference: 1.10: G-UR.2.1., G-UR.3.2., G-UR.4.1., 2.21: UR.2.5.

Inspect the entire material handling system, from load point to the discharge, inspecting all hoppers and transfer chutes, to ensure that there is no buildup of material or spillage that might create problems with normal measurements and material test results.

Material buildup in the hoppers or chutes must be removed prior to testing. Spillage must be removed and the cause of the spillage repaired prior to the test.

Verify that device meets all performance requirements when all associated or non-associated equipment is operated during testing (i.e., metal detectors/magnets, product additives, sampling equipment).

3.3. Magnets and Material Additives.

Code Reference: 1.10: G-UR.2.1., G-UR.3.2.

Magnets must not be located in close proximity to the scale area. Material additives not included as part of the product description must be introduced to the flow of product downstream from the belt-conveyor scale area. "Sweep-type" samplers are recommended to be located a minimum of 18 meters (60 feet) from the center of the belt-conveyor scale weigh area.

3.4. Zero-Load Balance and Level Condition.

3.4.1. Zero Ready Indicator.

A belt-conveyor scale shall be equipped with a zero-ready indicator that produces an audio or visual signal during an unloaded belt condition when the zero balance is within tolerance.

Code Reference: 2.21: S.1.9. (1/1/14).

3.4.2. Design of Zero-Setting Mechanism.

Resetting operation is carried out only after a whole number of belt revolutions and the completion of the setting or the whole operation is indicated.

Code Reference: 2.21: S.3.1. (1/1/90).

Except for systems that record the zero-load reference at the beginning and end of a delivery, the range of the zero-setting mechanism shall be as specified without breaking the security means.

Code Reference: 2.21: S.3.1. (1/1/04).

The automatic zero-setting mechanism shall indicate or record any change in the zero reference.

Code Reference: 2.21: S.3.1.1. (1/1/10).

3.5. Selection and Suitability.

3.5.1. Suitability, General.

Code Reference: 1.10: G-UR.1.1., G-UR.1.2.

3.5.2. Adjustable Components.

Code Reference: 2.21: S.2.2.

3.5.3. Electronic Adjustable Components.

Code Reference: 1.10: G-S.8. (1/1/90).

3.5.4. Designation of Weighing Devices, Accuracy Class.

Code Reference: 2.21: S.4. (1/1/20).

3.5.5. Environment.

3.5.5.1. Suitable for the environment in which it is used.

Code Reference: 1.10: G-UR.1.2.

3.5.5.2. Protection from environmental factors.

Code Reference: 2.21: UR.1.1.

3.5.6. Permanence.

Code Reference: 1.10: G-S.3.

3.6. Installation.**3.6.1. In Accordance with Manufacturer's Instructions.**

Code Reference: 1.10: G-UR.2.1.

3.6.2. Visibility of Identification. Installation to ensure ready visibility of markings.

Code Reference: 1.10: G-UR.2.1.1.

SAFETY REMINDER!!!

- **Check to be sure the scale supports are adequate to support the scale and test weights equal to the capacity of the scale!**

3.6.3. Scale Conveyor.**3.6.3.1. Test of Device Accuracy Under As-Found Conditions.**

If practicable, the scale should be material tested to determine the as-found accuracy of the scale before conveyor inspections and corrections are made.

Code Reference: 2.21: UR.1.3. (1/1/81), UR.3.

3.6.3.2. Inspect the entire conveyor.

The inspection should include checking for damage, malfunctions, or wear in: chutes; belting; infeed skirting; tail pulley; impact idlers; troughing idlers; training idlers; return idlers; bend pulleys; snubbing pulley; head pulley; belt scrapers; take-up device; take up weight; support steel; feed points; clearances; guard devices; and the conveyor drive.

Code Reference: 2.21: UR.1.

3.6.3.3. Inspect all idlers of the conveyor, both loaded and unloaded. If the belt does not conform to the requirements of NIST HB 44 installation requirements or faulty bearings are found then this must be corrected.

Code Reference: 2.21: UR.1.2.(m).

3.6.3.4. Inspect the skirt boards at the infeed point for proper alignment. If any spillage at this point exists, adjustments must be made to eliminate all spillage prior to the materials test.

Code Reference: 2.21: UR.1.2., UR.1.2.(l).

3.6.3.5. The conveyor structure must be rigid in design to prevent vibration and significant deflection.

Code Reference: 2.21: UR.1.2.(a).

3.6.3.6. Inspect the Take Up Unit, the bend pulley must travel freely when the belt is running and not bottom out at start up.

Code Reference: 2.21: UR.1.2.(d).

3.6.3.7. Inspect the Drive Unit for slippage or spillage, which must be corrected before testing begins.

Code Reference: 2.21: UR.1.2.

3.6.4. Scale.

3.6.4.1. Inspect the weigh area idlers for worn bearings and belt alignment. The weigh area idlers should freely rotate and have no signs of material build-up, holes in the rollers, or corrosion. Excessive noise from the idlers indicates friction or worn bearings that may also affect scale performance. Inspect any load cell stay rods or flexure plates for distortion or binding.

Code Reference: 2.21: UR.1.2.

3.6.4.2. Inspect the speed sensor; if the speed sensor is mounted on a non-driven bend pulley, it should be on the clean side of the return belt. Also check the bend pulley wrap to ensure positive contact. Check for material build-up on the speed sensing pulley, ensure sensor coupling is secure and has no worn bearings. The sensor should be corrected if a loose bearing exists on the shaft.

Code Reference: 1.10: G-UR.4.2., 2.21: UR.1.4.

3.6.4.3. Inspect the weighbridge support steel and bracing for the load cells and weighbridge.

Code Reference: 2.21: UR.1.2.(i).

3.6.4.4. Inspect belt alignment. The belt must not extend beyond the edge of the idler roller in any area of the conveyor, either empty or loaded and must not touch any structure on the return side. Verify that belt is tracking properly on idlers and rollers. Belt (or sections of belt) should not deviate excessively in its tracking location on the idlers or rollers during revolutions.

Code Reference: 2.21: UR.1.2.(m).

3.6.4.5. Inspect belt composition and maintenance. Belt should not exhibit excessive wear or extreme variation in uniform composition. The belt should make contact with all the rollers in the weigh area empty and loaded.

Code Reference: 2.21: UR.1.2.(k).

3.6.4.6. Based on observations, corrections must be made to the scale or the area surrounding the scale if foreign material adheres to the scale structure at any time during normal operation and materials tests.

Code Reference: 2.21: UR.3.(b).

3.6.5. Visibility of Identification. Installation to ensure ready visibility of markings and other required markings, including identification of scale area.

Code Reference: 1.10: G-UR.2.1.1., 2.21: UR.1.2.(j).

3.7. Use.

3.7.1. Facilitation of Fraud.

Code Reference: 1.10: G-S.2.

3.7.2. Operation with Associated and Nonassociated Equipment.

Code Reference: 1.10: G-UR.3.2.

3.7.3. Method of Operation.

Code Reference: 1.10: G-UR.3.1.

3.8. Maintenance.**3.8.1. Maintenance of Equipment, General.**

Code Reference: 1.10: G-UR.4., G-UR.4.1.

3.8.2. Abnormal Performance.

Code Reference: 1.10: G-UR.4.2.

3.8.3. Scale and Conveyor Maintenance.

Code Reference: 2.21: UR.3.

3.8.4. Use of Adjustments.

Code Reference: 1.10: G-UR.4.3.

3.8.5. Check for the presence security seals on any component designed to be sealed.

Code Reference: 1.10: G-UR.4.5.

3.9. Design of Weighing Device.**3.9.1. Designation of Weighing Devices, Accuracy Class.**

Code Reference: 2.21: S.4. (1/1/20).

3.10. Markings – Overview.

3.10.1. Identification. Equipment shall be clearly and permanently marked for the purpose of identification.

Code Reference: 1.10: G-S.1., G-S.1.1. (1/1/04), G-S.1.2.

3.10.2. Size and Character; Designation and Marking of Subordinate Values.

Code Reference: 1.10: G-S.5.2.3.

3.10.3. Values.

Code Reference: 1.10: G-S.5.2.4.

3.10.4. Permanence of Markings.

Code Reference: 1.10: G-S.5.2.5.

3.10.5. Operational Controls, Indications, and Features.

Code Reference: 1.10: G-S.6. (1/1/77).

3.10.6. Lettering.

Code Reference: 1.10: G-S.7.

3.10.7. Interchange or Reversal of Parts.*Code Reference:* 1.10: G-S.4.**3.11. General Markings.****3.11.1. Identification.***Code Reference:* 1.10: G-S.1.**3.11.1.1. Name, Initials, or Trademark of Manufacturer or Distributor.***Code Reference:* 1.10: G-S.1.(a).**3.11.1.2. Model Identifier.***Code Reference:* 1.10: G-S.1.(b).**3.11.1.2.1. Model Identifier Prefix and acceptable abbreviation for “Model” and “Number.”***Code Reference:* 1.10: G-S.1.(b)(1) (1/1/03).**3.11.1.3. Nonrepetitive Serial Number.***Code Reference:* 1.10: G-S.1.(c) (1/1/68).**3.11.1.3.1. Serial Number Prefix.***Code Reference:* 1.10: G-S.1.(c)(1) (1/1/86).**3.11.1.3.2. Acceptable abbreviations for “Serial” and “Number.”***Code Reference:* 1.10: G-S.1.(c)(2) (1/1/01).**3.11.1.4. As of 2004 the current software version or revision identifier for not-built-for-purpose software-based devices and as of 2022 the current software version or revision identifier for all software-based devices.***Code Reference:* 1.10: G-S.1.(d) (1/1/04), G-S.1.(d) (1/1/22).**3.11.1.4.1. Software Version or Identifier.***Code Reference:* 1.10: G-S.1.(d).

(1) Preface identifying it as such.

Code Reference: 1.10: G-S.1.(d)(1)i. (1/1/07).

(2) Continuously displayed or accessible via display.

Code Reference: 1.10: G-S.1.(d)(1)ii. (1/1/22).

(3) Acceptable abbreviations for “version,” “number,” and “revision.”

Code Reference: 1.10: G-S.1.(d)(2) (1/1/07).**3.11.1.5. NTEP CC Number for devices with NTEP CC.***Code Reference:* 1.10: G-S.1.(e) (1/1/03).

Preface by the terms “NTEP CC,” “CC,” or “Approval” followed by either the word or an acceptable abbreviation of “number.”

Code Reference: 1.10: G-S.1.(e) (1/1/03).

3.11.1.6. Location of marking information for Not-Built-For-Purpose, Software-Based Devices.

Code Reference: 1.10: G-S.1.1. (1/1/04).

3.11.1.7. Devices or main elements remanufactured as of January 1, 2002.

Code Reference: 1.10: G-S.1.2. (1/1/02).

Name, initials, or trademark of last remanufacturer or distributor.

Code Reference: 1.10: G-S.1.2.(a) (1/1/02).

Model designation if different from original model designation.

Code Reference: 1.10: G-S.1.2.(b) (1/1/02).

3.12. Device Specific Marking Requirements – Belt-Conveyor Scale Systems and Weigh-Belt Systems.

Code Reference: 2.21: S.5.

3.12.1. Rated Capacity - Units of Weight per Hour, Both Maximum and Minimum.

Code Reference: 2.21: S.5.(a).

3.12.2. Value of the Scale Division.

Code Reference: 2.21: S.5.(b).

3.12.3. Belt Speed. The belt speed in terms of feet or meters per minute at which the belt will deliver the rated capacity.

Code Reference: 2.21: S.5.(c).

3.12.4. Belt Load. The belt load in terms of pounds per foot or kilograms per meter (determined by material tests).

Code Reference: 2.21: S.5.(d).

3.12.5. Units Installed After January 1, 1986. On all new units installed after January 1, 1986, the operational temperature range shall be marked if it is other than - 10 °C to 40 °C (14 °F to 104 °F).

Code Reference: 2.21: S.5.(e) (1/1/86).

3.12.6. Accuracy Class.

Code Reference: 2.21: S.4. (1/1/20), S.5.(f) (1/1/20).

3.13. Indicating and Recording Elements.**3.13.1. Appropriateness of Design.****3.13.1.1. Accuracy Class.**

Code Reference: 2.21: S.4. (1/1/20).

3.13.1.2. Indicating and Recording Elements, General Design.

Code Reference: 1.10: G-S.5.1.

Units installed after January 1, 1986 must be equipped with a recording element and a rate of flow indicator and recorder.

Code Reference: 2.21: S.1.1. (1/1/86).

3.13.2. Value of the Scale Division.

3.13.2.1. Value - General.

Code Reference: 1.10: G-S.5.3., 2.21: S.1.3.

3.13.2.2. Value of the Scale Division for Scales Installed After January 1, 1986 must have a scale division not greater than 1/800 of the minimum totalized load (0.125 percent).

Code Reference: 2.21: S.1.3.1 (1/1/86).

3.13.2.3. Value of the Scale Division for Scales Installed Before January 1, 1986 must have a scale division not greater than 1/1200 of the minimum totalized load.

Code Reference: 2.21: S.1.3.2.

Use the relationship expressed in S.1.3.2. For Scales Installed Before January 1, 1986 to calculate the maximum value of the scale division in a unit increment of weight, as shown below in the example. Determine the appropriate value of the scale division for a system with a belt scale capacity of 1000 tons per hour:

Example:

Given the Belt Scale Capacity (rate in units of weight per hour) = 1000 tons per hour (tph)

Calculate the Maximum Value of the Scale Division in units of weight as follows:

$$1000 \text{ t} \times 1/1200 = 0.83 \text{ ton}$$

The permissible scale division value must be expressed in increments of 1, 2, or 5 as specified in S.1.2. Units.

Since the resulting 0.83 ton must not be exceeded and be expressed in a unit of weight equal to 1, 2, or 5, the rounding of the value of the scale division to the nearest increment of 1.0 ton does not comply with the requirement. In this case the value of 0.83 ton is rounded down to 0.50 ton to meet both applicable requirements for the value of the scale division's size.

3.13.2.4. Value of the Scale Division for Scales Marked with an Accuracy Class must have a scale division for a:

3.11.1.4.1. Class 0.25 scale not greater than 0.125 % (1/800) of the minimum totalized load for the scale.

3.11.1.4.2. Class 0.1 scale not greater than 0.05 % (1/2000) of the minimum totalized load for the scale.

Code Reference: 2.21: S.1.3.3. (1/1/20).

3.13.3. Repeatability.

Code Reference: 1.10: G-S.5.4.

3.13.4. Recorded Representations.

3.13.4.1. Recorded Representations, General.

Code Reference: 1.10: G-S.5.6.

3.13.4.2. Indicated and Recorded Representation, Abbreviations of Units.

Code Reference: 1.10: G-S.5.6.1.

Equipment manufactured on or after January 1, 2008.

Code Reference: 1.10: G-S.5.6.1.(a).

Equipment manufactured prior to January 1, 2008.

Code Reference: 1.10: G-S.5.6.1.(b).

3.13.4.3. The value of the scale division of the recording element shall be the same as that of the indicating element.

Code Reference: 2.21: S.1.4. (1/1/86).

3.13.4.4. The information for the unit of measurement, date, time, the initial indication and final indication of the master weight totalizer, and the quantity must be recorded for each delivery for systems installed after January 1, 1994.

3.13.4.4.1. The belt-conveyor scale system shall record the unit of measurement (i.e., kilograms, tonnes, pounds, tons, etc.); the date; and the time.

3.13.4.4.2. The belt-conveyor scale system shall record the initial indication and the final indication of the master weight totalizer and the quantity.

Code Reference: 2.21: S.1.4.(a) (1/1/86) and (b) (1/1/94).

3.13.4.5. The belt-conveyor scale system shall be capable of recording the results of automatic or semi-automatic zero load test of scales installed after January 1, 2004.

Code Reference: 2.21: S.1.4.1. (1/1/04).

3.13.4.6. Rate of Flow Indicators and Recorders.

3.13.4.6.1. A belt-conveyor scale shall be equipped with a rate of flow indicator and an analog or digital recorder.

3.13.4.6.2. Permanent means shall be provided to produce an audio or visual signal when the rate of flow is equal to or less than 20 % and when the rate of flow is equal to or greater than 100 % of the rated capacity of the scale. The type of alarm (audio or visual) shall be determined by the individual installation.

Code Reference: 2.21: S.1.5. (1/1/86).

3.14. Weighing Elements.**3.14.1. Speed Measurement.**

Belt-conveyor scale shall be equipped with a belt speed or travel sensor that will accurately sense the belt speed or travel whether the belt is empty or loaded.

Code Reference: 2.21: S.2.1.

3.14.2. Adjustable Components.

An adjustable component that can affect the performance of the device (except as prescribed in S.3.1. Design of Zero-Setting Mechanism) shall be held securely in adjustment.

Code Reference: 2.21: S.2.2.

3.14.3. Overload Protection.

The load-receiving elements shall be equipped with means for overload protection of not less than 150 % of rated capacity.

Code Reference: 2.21: S.2.3.

3.15. Provision for Sealing.

3.15.1. Sealing, General.

A device shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.

Code Reference: 1.10: G-S.8. (1/1/90).

A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.

Code Reference: 1.10: G-S.8.

The master weight totalizer (MWT) shall not be resettable without breaking a security means for devices manufactured after January 1, 1986.

Code Reference: 2.21: S.1.7. (1/1/86).

Except for systems that record the zero-load reference at the beginning and end of a delivery, the range of the zero-setting mechanism shall not be greater than $\pm 2\%$ of the rated capacity of the scale without breaking the security means. For systems that record the zero-load reference at the beginning and end of a delivery, the range of zero-setting mechanism shall not be greater than $\pm 5\%$ without breaking the security means.

Code Reference: 2.21: S.3.1. (1/1/04).

Provisions shall be made to seal access to load cell and integrator calibration adjustments. Devices manufactured after January 1, 1999 are permitted to have an approved means for providing security such as a data change audit trail available to the inspector at the time of inspection.

Code Reference: 2.21: S.6. (1/1/99).

Except for devices and systems adjusted using a removable digital storage device, the following provisions for sealing apply:

Provision shall be made for applying a security seal in a manner that requires the security seal to be broken before an adjustment can be made to any component affecting the performance of an electronic device.

Code Reference: 2.21: S.6. (1/1/99).

A device shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.

Code Reference: 2.21: S.6. (1/1/99).

A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.

Code Reference: 1.10: G-S.8.2.

Audit trails shall use the format set forth in Table S.6. Categories of Device and Methods of Sealing.
Code Reference: 2.21: S.6. (1/1/99), Table S.6. (1/1/99).

3.15.2. A metrologically significant software change is a sealable event.

Code Reference: 1.10: G-S.9.

3.15.3. Physical Means of Security.

3.15.3.1. Security Seals. Check for the presence of security seals on the device. A security seal shall be affixed to any adjustment mechanism designed to be sealed. Document missing seals on the official report and apply new ones as needed.

Code Reference: 1.10: G-UR.4.5.

3.15.3.2. Accessibility to Security Seals. When applicable, the adjusting mechanism shall be readily accessible for the purpose of affixing a security seal. The device shall be installed or located such that access is provided to permit inspecting and applying security seals.

Code Reference: 1.10: G-UR.2.3.

3.15.4. Parameters Accessed Via Removable Digital Storage.

For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device*, such as a secure digital (SD) card, USB flash drive, etc., security shall be provided for those parameters using either:

- (1) an event logger in the device; or
- (2) a physical seal that must be broken in order to remove the digital storage device from the device (or system).

* This applies only to removable digital storage devices that must remain in the device or system for it to be operational.

Code Reference: 1.10: G-S.8.2., 2.21: S.6.Table S.6. (1/1/99).

3.15.5. Audit Trails, General.

3.15.5.1. Audit Trail Information. If the system is equipped with an audit trail, note the event counter settings on the report form for future reference. If equipped with an event logger, print a copy of the event log and attach it to the report form for future reference. Note that on some systems an electronic copy of the event log may also be available; however, the system must still be able to provide a hard copy. Examine these records for any signs of misuse of adjustments.

Code Reference: 1.10: G-S.8. (1/1/90), 2.21: S.6.(1/1/99), Table S.6. (1/1/99).

3.15.5.2. Single Provision for Sealing Multiple Elements. For multiple measuring elements with a single provision for sealing, a change to the adjustment of any measuring element must be individually identified.

Code Reference: 1.10: G-S.8.1. (1/1/10).

3.15.6. Event Logger.

If security is provided using an event logger, the event logger shall include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter.

The event logger information must be available on demand through the device or through another on-site device at the time of inspection.

In addition to providing a printed copy of the information, the information may be made available electronically.

The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)

Code Reference: 1.10: G-S.8. (1/1/90), 2.21: S.6., Table S.6. (1/1/99).

4. Pretest Determinations.

NOTE: Code references used throughout the document are drawn from NIST Handbook (HB) 44 General Code (Section 1.10) and Belt-Conveyor Scale Systems Code (Section 2.21). The relevant code section(s) is cited by its numerical designation and the applicable requirement(s) from that code section is identified by letter-number designation only. The code section and paragraph designation(s) are then shown immediately after the corresponding line item or task listed in the procedure. For example, NIST HB 44 General Code (Section 1.10) is designated as “1.10:” followed by the paragraph designation(s) relevant to the line item. Nonretroactive requirements are followed by the applicable date in parentheses.

4.1. Tolerances – General.

The provisions of NIST Handbook 44 include test methods for verifying compliance of commercial weighing and measuring systems. However, this does not preclude the use of other test methods and apparatus that have been approved by the Director as described in NIST Handbook 44, Appendix A – Fundamental Considerations, Section 3. Testing Apparatus. If other test standards and apparatus are used, corresponding adjustments to the test procedures described in this EPO may be needed to reflect the use of that equipment.

4.1.1. Acceptance/Maintenance Tolerances.

Code Reference: 1.10: G-T.1., G-T.2.

4.1.2. Application.

Code Reference: 1.10: G-T.3.

4.1.3. Intermediate Values.

Code Reference: 1.10: G-T.4.

4.2. Tolerance Values.

4.2.1. Material Tests.

- (a) ± 0.25 % of the test load for systems not marked with an accuracy class;
- (b) ± 0.25 % of the test load for systems marked Class 0.25; and
- (c) ± 0.1 % of the test load for systems marked Class 0.1.

Code Reference: 2.21: T.1.

4.2.1.1. Test of Zero Stability.

Code Reference: 2.21: T.1.1.

4.2.2. Repeatability and Linearity Tests.

4.2.2.1. Repeatability Tests.*Code Reference:* 2.21: T.2.1.**4.2.2.2. Linearity Tests for Systems that Operate Using Multiple or Variable Flow Rates.***Code Reference:* 2.21: T.2.2.**4.3. Belt-Conveyor Scale System Suitable for Material Loading and Total Load Size.****4.3.1. Determine if the conveyor scale is suitable for the amount of product weighed.**

4.3.1.1. The belt-conveyor scale system may be operated between 20 and 100 percent of its rated capacity. Record the maximum and minimum feed rate and run time it takes to deliver a test load. Determine the percentage of rated capacity.

Code Reference: 2.21: UR.2.1.

Shown below in the example is the method for use to determine the feed rate as a percentage of the belt-conveyor scale system's rated capacity.

Example:

The scale has a rated capacity of 500 tons per hour (tph).

A test load of 80 tons was delivered in 15 minutes.

$$\text{Feed Rate} = \frac{60 \text{ minutes/hour}}{\text{delivery time}} \times \text{test load}$$

$$\text{Feed Rate} = \frac{60 \text{ minutes/hour}}{15 \text{ minutes}} \times 80 \text{ tons}$$

$$\text{Feed Rate} = \frac{4}{\text{hour}} \times 80 \text{ tons} = 320 \text{ tons/hour}$$

$$\text{Feed Rate Percentage Rated Scale Capacity} = \frac{\text{Feed Rate}}{\text{Scale Rated Capacity}} \times 100$$

$$\text{Feed Rate Percentage Rated Scale Capacity} = \frac{320 \text{ tons/hour}}{500 \text{ tons/hour}} \times 100$$

$$\text{Feed Rate Percentage Rated Scale Capacity} = 0.64 \times 100 = 64 \%$$

4.3.1.2. Delivered quantities of less than the minimum test load shall not be considered a valid weighment.

Code Reference: 2.21: UR.2.2.

4.3.1.3. Material must not slip on the belt due to the angle of belt incline, belt speed or loading process. Material slipping backwards (in the opposite direction of belt travel) on an inclined belt-conveyor scale results in material being weighed more than once.

Code Reference: 2.21: UR.1.2.(h) and (l).

5. Test Notes.

NOTE: Code references used throughout the document are drawn from NIST Handbook (HB) 44 General Code (Section 1.10) and Belt-Conveyor Scale Systems Code (Section 2.21). The relevant code section(s) is cited by its numerical designation and the applicable requirement(s) from that code section is identified by letter-number designation only. The code section and paragraph designation(s) are then shown immediately after the corresponding line item or task listed in the procedure. For example, NIST HB 44 General Code (Section 1.10) is designated as “1.10:” followed by the paragraph designation(s) relevant to the line item. Nonretroactive requirements are followed by the applicable date in parentheses.

5.1. Test Methods.

Permissible test methods for verifying compliance of commercial weighing and measuring systems with the provisions of NIST Handbook 44 include, but are not limited to, test methods and apparatus that have been approved by the Director as outlined in NIST HB 44 Appendix A – Fundamental Considerations.

Code Reference: 1.10: G-N.3., Appendix A – Fundamental Considerations.

5.2. Zero Balance. The zero-balance condition of a belt-conveyor scale shall be maintained such that, prior to beginning any commercial transaction, with no load on the belt, the zero-balance condition is within:

- (1) ± 0.12 % of the scale’s rated capacity for systems marked Class 0.25.
- (2) ± 0.05 % of the scale’s rated capacity for systems marked Class 0.1.

Code Reference: 2.21: UR.3.(a).

5.3. Repeatability. Check repeatability of indications throughout the test.

5.3.1. Repeatability of Indications.

Tolerance Values, Repeatability Tests. – The variation in the values obtained during the conduct of materials tests shall not be greater than 0.25 % (1/400) for systems not marked with an Accuracy Class and for systems marked Class 0.25.

Code Reference: 1.10: G-S.5.4., 2.21: T.2.1.(a) and (b).

Tolerance Values, Repeatability Tests. – The variation in the values obtained during the conduct of materials tests shall not be greater than 0.1 % (1/1000) for systems marked Class 0.1.

Code Reference: 1.10: G-S.5.4., 2.21: T.2.1.(c).

5.4. Minimum Load for the Materials Test. Determine the minimum amount of material to pass over the belt-conveyor scale for materials test.

Code Reference: 2.21: N.2.3.

5.4.1. Minimum Test Run Weight-Belt Systems. Each test is to be run for not less than the larger of the following values:

- (a) 800 scale divisions for systems not marked with an accuracy class, 800 scale divisions for systems marked Class 0.25, and 2000 scale divisions for systems marked Class 0.1;
- (b) the load obtained at maximum flow rate in one revolution of the belt; or
- (c) the load obtained during at least one minute of operation.

Code Reference: 2.21: N.2.3.1.

5.4.2. Minimum Test Run All Other Belt-Conveyor Scale Systems.

Except for applications where a normal weighment is less than ten minutes, the minimum test load shall not be less than the largest of the following values:

- (a) 800 scale divisions for systems not marked with an accuracy class, 800 scale divisions for systems marked Class 0.25, and 2000 scale divisions for systems marked Class 0.1; or
- (b) the load obtained at maximum flow rate in one revolution of the belt; or
- (c) the load obtained during at least ten minutes of operation.

Code Reference: 2.21: N.2.3.2.

5.4.3. Minimum Test Run for Normal Weighments Less Than Ten Minutes.

For applications where a normal weighment is less than ten minutes (e.g., belt-conveyor scale systems used exclusively to issue net weights for material conveyed by individual vehicles and railway track cars) the minimum test load shall be the normal weighment that also complies with N.2.3.2. Minimum Test Load, All Other Belt-Conveyor Scale Systems (a) and (b).

The official with statutory authority may determine that a smaller minimum totalized load down to 2 % of the load totalized in one hour at the maximum flow rate may be used for subsequent tests, provided that:

- (a) the smaller minimum totalized load is greater than the quantities specified in N.2.3.2.(a) and (b); and
- (b) consecutive official testing with the minimum totalized loads described in N.2.3.2.(a), (b), or (c) and the smaller minimum test load has been conducted that demonstrates the system complies with applicable tolerances for repeatability, acceptance, and maintenance.

Code Reference: 2.21: N.2.3.2.

5.4.4. Reference Scale and Reference Material.

5.4.4.1. The containers used in the material test should be inspected. They may be railroad cars, trucks, hoppers, or barges. They must not leak and should be large enough so that overloading or spillage does not occur.

Code Reference: 2.21: N.3.2.(a).

5.4.4.2. Determine accuracy of reference scale. It is preferable to verify the accuracy of the reference scale within 24 hours of the weight determination of the material used for the belt-conveyor materials test. (For vehicle scales refer to test procedure in NIST Examination Procedure Outline Number 13 for Vehicle and Axle-Load Scales Part I – Electronic Digital Indicating and Vehicle and Axle-Load Scales Part II - Mechanical-Analog Indicating.)

- (a) For scales not marked and those marked Class 0.25, the quantity of material used to conduct a material test shall be weighed on a reference scale to accuracy within 0.1 %.
- (b) For scales marked Class 0.1, the quantity of material used to conduct a material test shall be weighed on a reference scale to accuracy within 0.035 %.

Code Reference: 2.21: N.3.2.(d), N.3.2.1.(a) and (b).

5.4.4.3. After the reference scale test and before commencing the belt scale materials test, attempt to establish the weight of a reference load. This reference load can be used to re-verify the reference scale after the reference scale test equipment has left the test site.

Code Reference: 2.21: N.3.2.(e).

5.4.5. Material Test Conditions.

Code Reference: 2.21: N.3.2.(f).

Note (record) the following conditions before starting the test.

- Current weather and temperature.
- Check security system to determine if any metrological integrity items have been changed.
- The “as found” zero and span numbers.
- The “as found” auto zero track deviation from zero.
- The zero-load repeatability test, before and immediately after the official materials test.

5.4.6. Determine Tolerance Requirements.

5.4.6.1. Test of Zero Stability.

A series of zero-load tests shall be carried out immediately before conducting the simulated load or materials test until the three consecutive zero-load tests each indicate an error which does not exceed:

- (a) $\pm 0.06\%$ of the totalized load at full scale capacity for the duration of the test for scales not marked with an accuracy class;
- (b) $\pm 0.06\%$ of the totalized load at full scale capacity for the duration of the test for scales marked Class 0.25; or
- (c) $\pm 0.03\%$ of the totalized load of full scale capacity for the duration of the test for scales that are marked Class 0.1.

No adjustments can be made during the three consecutive zero-load test readings.

Code Reference: 2.21: N.3.1.2.

Shown below in the example is the method for determining the permissible error in zero for a belt-conveyor scale where the applicable tolerance is $\pm 0.06\%$.

Example:

Belt-Conveyor Scale Capacity: 700 tons per hour (tph)

Test Duration: 3 minutes

Calculate the permissible zero test error:

$$\left(\frac{\text{Zero Load Test Tolerance}}{100}\right) \times \text{Belt-Conveyor Scale Capacity} \times \left(\frac{\text{Test Duration}}{60 \text{ min/h}}\right) = \pm \text{Zero Test Error}$$

$$\left(\frac{0.06}{100}\right) \times 700 \text{ tph} \times \left(\frac{3 \text{ min}}{60 \text{ min/h}}\right) = \pm 0.021 \text{ tons}$$

5.4.6.2. Zero Stability Following a Material Test.

The change in the accumulated or subtracted weight during the zero-load test shall not exceed:

- (a) 0.12 % of the totalized load at full scale capacity for the duration of that test for scales that are not marked with an accuracy class;
- (b) 0.12 % of the totalized load at full scale capacity for the duration of that test for scales marked Class 0.25; and
- (c) 0.06 % of the totalized load at full scale capacity for the duration of the test for scales that are marked Class 0.1.

If the range of zero adjustments during a complete (official) verification test exceeds 0.18 % of the totalized load at full scale capacity for the duration of the zero-load test for unmarked scales and those marked Class 0.25 or 0.09 % of the totalized load at full scale capacity for the duration of the zero-load test for scales marked Class 0.1, the official with statutory authority may establish an interval for zero-load testing during normal operation.

Code Reference: 2.21: T.1.1.

5.4.6.3. Check for Consistency of the Conveyor Belt along Its Entire Length.

During a zero-load test with any operational low-flow lock-out disabled, the absolute value of the difference between the maximum and minimum totalizer readings indicated on the totalizer during any complete revolution of the belt shall not exceed 0.12 % of the minimum test load.

NOTE: The end value of the zero-load test must meet the values referenced in N.3.1.2. Test for Zero Stability of:

- (1) ± 0.06 % for scales not marked with an accuracy class;
- (2) ± 0.06 % for scales marked Class 0.25; or
- (3) ± 0.03 % for scales that are marked Class 0.1.

Code Reference: 2.21: N.3.1.3.

5.4.7. Abnormal Performance.

Code Reference: 1.10: G-UR.4.2.

5.4.8. Recorded Representations.

5.4.8.1. Availability of Recorded Representation. Verify that any options available for obtaining a recorded representation are appropriate. For systems specifically required by a section of the Belt-Conveyor Scales Systems Code to issue a recorded representation, the recorded representation shall be made available to the customer in hard copy form unless otherwise specified by the customer. The customer may be given the option of not receiving the recorded representation. If the system is equipped with the capability of issuing an electronic receipt, the customer may also be given the option of receiving the recorded representation electronically (e.g., via cell phone, computer, etc.) in lieu of or in addition to a hard copy.

Code Reference: 1.10: G-S.5.6.

5.4.9. Steps After Each Test Load – Recorded Representations. If the scale is equipped with a printer, print a ticket or label at each test load. Verify the following:

5.4.9.1. Digital Indication and Representations, Agreement and Display. Check that any recorded representations agree with their associated corresponding values that are displayed and are appropriately displayed.

Code Reference: 1.10: G-S.5.2.2., G-S.5.6.

5.4.9.2. Value of the Indicated and Recorded Scale Division. Verify that the value of the scale division as recorded on the recorded representation is the same as the division value indicated.

Code Reference: 2.21: S.1.4. (Portions 1/1/86 and 1/1/94).

SAFETY REMINDER!!!

- **Wear Safety Shoes!**
- **Use Proper Lifting Techniques!**

6. Test.

NOTE: Code references used throughout the document are drawn from NIST Handbook (HB) 44 General Code (Section 1.10) and Belt-Conveyor Scale Systems Code (Section 2.21). The relevant code section(s) is cited by its numerical designation and the applicable requirement(s) from that code section is identified by letter-number designation only. The code section and paragraph designation(s) are then shown immediately after the corresponding line item or task listed in the procedure. For example, NIST HB 44 General Code (Section 1.10) is designated as “1.10:” followed by the paragraph designation(s) relevant to the line item. Nonretroactive requirements are followed by the applicable date in parentheses.

6.1. Zero-Load Tests.

If the belt has been idle 2 hours or more, run empty for 30 minutes if temperature is 5 °C (41 °F) or above (longer if temperature is less than 5 °C (41 °F)) before starting the zero-load test.

Code Reference: 2.21: N.3.1.

6.1.1. Determination of Zero:

6.1.1.1. For belt-conveyor scales with electronic integrators, the test must be performed over a period of at least 3 minutes and with a whole number of complete belt revolutions.

6.1.1.2. For belt-conveyor scales with mechanical integrators, the test shall be performed with no less than three complete revolutions or 10 minutes of operation, whichever is greater.

6.1.1.3. For weigh-belt systems, the test must be performed over a period of at least one minute and at least one complete revolution of the belt.

Code Reference: 2.21: N.3.1.1.

6.1.2. Test of Zero Stability.

6.1.2.1. A series of zero-load tests shall be carried out immediately before conducting the simulated load or materials test until the three consecutive zero-load tests each indicate an error which does not exceed:

- a. ± 0.06 % of the totalized load at full scale capacity for the duration of the test for scales not marked with an accuracy class;
- b. ± 0.06 % of the totalized load at full scale capacity for the duration of the test for scales marked Class 0.25; or
- c. ± 0.03 % of the totalized load of full scale capacity for the duration of the test for scales that are marked Class 0.1.

6.1.2.2. No adjustments can be made during the three consecutive zero-load test readings.

Code Reference: 2.21: N.3.1.2.

6.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length.

6.1.3.1. During a zero-load test with any operational low-flow lock-out disabled, the absolute value of the difference between the maximum and minimum totalizer readings indicated on the totalizer during any complete revolution of the belt shall not exceed 0.12 % of the minimum test load.

NOTE: The end value of the zero-load test must meet the values referenced in N.3.1.2. Test for Zero Stability of:

- (1) ± 0.06 % for scales not marked with an accuracy class;
- (2) ± 0.06 % for scales marked Class 0.25; or
- (3) ± 0.03 % for scales marked Class 0.1.

Code Reference: 2.21: N.3.1.3.

Any changes in the zero reference shall result in the action taken listed in UR.3.(d)(1) Simulated and Zero-Load Test Intervals for testing between official tests and during official tests.

6.2. Material Tests.

6.2.1. Initial Steps.

6.2.1.1. At the start of the test, write down the starting totalizer reading. Pass material over weigh-belt using either pre-weighed material with controlled delivery or weigh material delivered from the belt.

Code Reference: 2.21: N.3.2.

6.2.1.2. Record the maximum and minimum feed rates during the delivery of the materials. Calculate the average feed rate.

6.2.2. Rate of Flow Indicators.

Code Reference: 2.21: S.1.5. (1/1/86).

Permanent means shall be provided to produce an audio or visual signal when the rate of flow is equal to or less than 20 % and when the rate of flow is equal to or greater than 100 % of the rated capacity of the scale. Different feeders or different feed rates may require additional materials tests.

6.2.3. Number of Test Runs and Flow Rates.

Code Reference: 2.21: N.2, N.2.1.

6.2.3.1. Initial Tests.

6.2.3.2.1. A belt-conveyor scale system shall be verified with a minimum of two test runs at each of the following flow rates:

- (a) normal use flow rate,
- (b) 20 % of the maximum rated capacity, and
- (c) an intermediate flow rate between these two points.

6.2.3.2.2. Test runs may also be conducted at any other rate of flow that may be used at the installation.

Or:

A minimum of four test runs may be conducted at only one flow rate if evidence is provided that the system is used at a single flow rate and that rate does not vary in either direction by an amount more than 10 % of the normal flow rate that can be developed at the installation for at least 80 % of the time.

6.2.3.2.3. Belt must be loaded so that the rate of flow indicator is maintained between 20 % and 100 % of rated capacity.

Code Reference: 2.21: UR.2., UR.1.2.(1).

6.2.3.2. Subsequent Tests.

Code Reference: 2.21: N.2.2.

Subsequent testing shall include testing at the normal use flow rate and other flow rates used at the installation. The official with statutory authority may determine that testing only at the normal use flow rate is necessary for subsequent verifications if evidence is provided that the system is used to operate:

- (a) at no less than 70 % of the maximum rated capacity for at least 80 % of the time (excluding time that the belt is unloaded), or
- (b) with a normal use flow rate that does not vary by more than 10 % of the maximum rated capacity.

Example: If a belt-conveyor scale system has a maximum rated capacity of 200 tons per hour (tph), and the normal use flow rate is 150 tph (75 % of the maximum rated capacity), no testing at additional flow rates is required provided the flow rates remain above 140 tph for more than 80 % of the time. If the same device were operating with a normal use flow rate of 130 tph, it is operating at 65 % of the maximum rated capacity. Testing at flow rates in addition to the normal use flow rate would be required if the normal use flow rate varies by more than 20 tph (10 % of the maximum rated capacity).

6.2.4. Tests Results.

Code Reference: 2.21: T.1.

6.2.4.1. Compare net weight of material passed over belt as shown by belt totalizer with net weight established by reference scale and determine error. In this case, the permissible tolerance specified in T.1. Tolerance Values is ± 0.25 % of the test load.

Refer to Table in UR.3.(d)(ii) Simulated Load or Material Test Intervals and Actions to determine what action is necessary based on the error observed.

Example: Calculate error and tolerance when 101.7 tons of pre-weighed material is passed over a 500 ton per hour belt scale and the final totalizer reading is 101.9 tons.

Belt totalizer reading: 101.9 tons (indicated net weight)

Pre-weighed material: 101.7 tons (weight determined on the reference scale)

Error = + 0.2 ton

% Error = $(+ 0.2 \text{ tons}/101.7 \text{ tons}) \times 100 = 0.197 \%$

% Error = + 0.197 % (complies or meets tolerance)

Tolerance: $\pm 0.25 \%$

The above calculations may also be made using the following steps:

% Error =

$[(\text{Indicated Net Weight} - \text{Reference Standard Weight})/\text{Reference Standard Weight}] \times 100$

% Error = $[(101.9 - 101.7) / 101.7] \times 100 = + 0.197 \%$

Range of allowable totalizer readings 101.4 tons to 102.0 tons.

6.2.5. Repeatability Test. Any subsequent material testing shall consist of at least two individual tests under practically identical test conditions to determine repeatability of the scale. The variation in the values obtained during the conduct of materials tests shall not be greater than 0.25 % (1/400) for systems not marked with an Accuracy Class and for systems marked Class 0.25 and shall not be greater than 0.1 % (1/1000) for systems marked Class 0.1.

Code Reference: 2.21: N.3.2., T.2.1.

6.2.6. Simulated Test. A simulated test, as recommended by the manufacturer, shall be performed within 12 hours after a material test has established scale accuracy. Record the established factor that relates the results of the simulated load tests to the results of the materials tests. Results of the simulated load test shall repeat within 0.1 percent.

Code Reference: 2.21: N.3.3. N.3.3.(c), UR.3.(d), UR.3.(f).

SAFETY REMINDER!!!

- **Wear Safety Shoes!**
- **Use Proper Lifting Techniques!**

7. Post-Test Tasks.

NOTE: Code references used throughout the document are drawn from NIST Handbook (HB) 44 General Code (Section 1.10) and Belt-Conveyor Scale Systems Code (Section 2.21). The relevant code section(s) is cited by its numerical designation and the applicable requirement(s) from that code section is identified by letter-number designation only. The code section and paragraph designation(s) are then shown immediately after the corresponding line item or task listed in the procedure. For example, NIST HB 44 General Code (Section 1.10) is designated as “1.10:” followed by the paragraph designation(s) relevant to the line item. Nonretroactive requirements are followed by the applicable date in parentheses.

7.1. Security Means.

Adequate provision shall be made for applying a physical security seal and/or providing other approved means of security such as a data change audit trail.

Code Reference: 1.10: G-S.8. (1/1/90), G-S.8.1. (1/1/10), 2.21: S.1.11. (portions Nonretroactive), Table S.1.11. (1/1/95).

For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. Devices and Systems Adjusted Using Removable Digital Storage Devices.

Code Reference: 1.10: G-S.8.2., 2.21: S.1.11.1.

For multiple measuring elements with a single provision for sealing, a change to the adjustment of any measuring element must be individually identified.

Code Reference: 1.10: G-S.8.1. (1/1/10).

A metrologically-significant software change is a sealable event.

Code Reference: 1.10: G-S.9.

7.1.1. Audit Trail Information. If the system is equipped with an audit trail, note the event counter settings on the report form for future reference. If equipped with an event logger, print a copy of the event log and attach it to the report form for future reference. Note that on some systems an electronic copy of the event log may also be available; however, the system must still be able to provide a hard copy. Examine these records for any signs of misuse of adjustments.

Code Reference: 1.10: G-S.8. (1/1/90), 2.21: S.6. (1/1/99), Table S.6. (1/1/99).

7.1.2. Security Seal. Check for the presence of security seals on the device. Document missing seals on the official report and apply new ones as needed.

Code Reference: 1.10: G-UR.4.5., 2.21: UR.2.3.

7.2. Review/Analyze Results. After all equipment at a location has been tested, review the results to determine compliance with requirements for equipment maintenance and use of adjustments.

Code Reference: 1.10: G-UR.4.1., G-UR.4.3.

7.3. Post-Test Inspection of the Conveyor and the Material Handling System.

Code Reference: 2.21: N.3.2.(a) and (c), UR.2.5.

- Walk through the complete system from load point to discharge, inspecting all hoppers, feeders, belts, and transfer chutes for spillage and build up of material.
- Any spillage occurring during the material test should be noted and reported, however insignificant the spillage may seem.
- Any material build up on the scale structure or belt should also be noted and reported.
- If material build up or spillage that occurred during the material test is determined to be large enough to have biased the test and the actual weight cannot be determined from a traceable standard then the test is not valid.
- This includes test material that may have been left in the containers during the unloading process.

Record Compliance Action and Explain Results. Record the compliance action and disposition of the device on the report and explain the results to the device owner.

SAFETY REMINDER!!!

- **Secure all test equipment when transporting it to next location.**

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