

Guide to Understanding Scale Calibration Procedures

The following guide attempts to help users understand the tests and procedures applied in professional scale calibrations.



INTRODUCTION

The purpose of this guide is to allow the scale user to understand Wedderburn's Calibration Report.

The tests are based on industry standard tests and the test titles are based on industry standard names, although some of these tests are also known by alternative names.

TYPES OF REPORTS & THEIR PURPOSE

Scale Calibration Report

A peace-of-mind report that can be completed on any weighing machine. It is an elementary assessment of how the device performed at the time of being tested.

Weights & Measures Certificate of Accuracy - Trading By Weight

If you are selling by weight in New Zealand to comply with New Zealand Weights & Measures Legislation you will need a different set of tests and report for your weighing device.

The weighing device must be certified Legal for Trade Use, and it is recommended you have a current Certificate of Accuracy test and report for this scale. Wedderburn can provide you with both.

IANZ Endorsed Certificate - Traceable Endorsed Reports

If you need a traceable endorsed report then you will need an IANZ report.

Wedderburn are able to supply the above mentioned reports, please call us to discuss your requirements.

Full Weight Range Accuracy

Repeatability Testing

Eccentricity Testing

Assembly Checks

Indicator Performance

Loading Accuracy

Tare Accuracy

Testing with "Make Weights"



Specifications may change without notice

▲ Weighing Scales.

Weighing Scales. Packaging Equipment. Labelling Equipment.
Labels. Food Equipment. POS Solutions. Maintenance & Repairs.

TEST WEIGHTS

All masses (weights) used in the tests, apart from possibly repeatability tests, are traceable to national standards. This means that our masses are tested against masses traceable to masses held by the government department MSL, a division of Callaghan Innovation.

Callaghan Innovation are the custodians of the New Zealand prototype 1kg. This 1kg mass is traceable to world standards held by OIML in Sèvres, France.



TYPES OF TESTS CONDUCTED

Linearity Tests

Purpose of this test is to determine accuracy of the readings across the full weighing range of the scale.

1. Divide full range into five approximately equal intervals
2. Apply load for first test point and allow reading to stabilize
3. Without unloading apply necessary load to reach next test point and allow reading to stabilize
4. Repeat step 3 until full capacity is reached

For large capacity scales it is acceptable to reduce the number of test points to two or three.

This is not a pass/fail test. It is up to the user of the scale to determine if the readings obtained are within acceptable limits for their operation.

Repeatability Tests

Purpose of this test is to determine variations in readings, if any, when the scale under test is being loaded and unloaded multiple times with the same amount of load.

Although it is common practice to use standard weights for all tests, repeatability tests can be conducted with any substitution material provided it is stable during the test. For large capacity scales sometimes it is more practical to do so.

1. Use weights between one third and full capacity of the scale under test
2. Apply load to receptor and allow indication to stabilize
3. Remove load from load receptor and confirm reading goes back to zero.
4. For medium accuracy scales repeat steps 1 to 3 three times
5. For high accuracy lab scales repeat steps 1 to 3 six times

This is not a pass/fail test. It is up to the user of the scale to determine if the readings obtained are within acceptable limits for their operation.

Eccentricity Tests

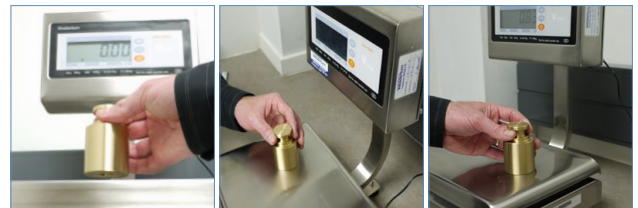
Purpose of this test is to determine variations in readings, if any, if a load is applied to various positions on the load receptor.

This test is conducted using weight of approximately one third of the full capacity of the scale.

1. Start the test by placing the test load in the centre of the load receptor
2. Place the test load in the centre of each quarter of the load receptor to determine deviation caused by off-centre loading.

In the case where the scale is fitted with a self-centering load receptor e.g. hopper, tank or hanging, the eccentricity test is not carried out.

This is not a pass/fail test. It is up to the user of the instrument to determine if the readings obtained are within acceptable limits for their operation.



Assembly Tests

Before commencing testing make sure the receptor is not damaged and is fit for the purpose. Depending on the machine type, the receptor is a scale platter, bowl or scoop, or in the case of a hanging scale shackles and slings.

In the case of a mechanical scale, make sure the indicator hand is not damaged and the movement around the chart is not impeded. Make sure the chart is clear. In the case of a double face mechanical indicator make sure both charts are aligned.



TYPES OF TESTS CONDUCTED CONTINUED...

Indicator Tests

1. Visually inspect the indicator for any damage.
2. View of the indicator should not be obstructed.
3. Make sure all functions are working as they supposed to.



Up / Down Weighing

Purpose of this test is to find out if the weighing instrument indicates the same weights in both loading and unloading directions.

Before commencing this test make sure there is no load on the scale.

1. Place Load A onto the scale (this load should be at least 20% of the maximum capacity of the scale)
2. Add additional Load B. The indication should be A+B
3. Remove the additional Load B
4. The scale should indicate previously loaded value A
5. Remove weight A to ensure scale has returned to Zero

This is not a pass/fail test. It is up to the user of the instrument to determine if the readings obtained are within acceptable limits for their operation.

Tare Accuracy

Purpose of this test is to determine that the stated tare value on instrument face plate is the maximum amount which can be tared.

1. Load the instrument under test to stated tare value plus one more scale division
2. Push tare button
3. Tare reduction should not be enabled
4. Remove amount of weight equal to one scale division
5. Push tare button
6. Tare reduction should be enabled

USING MAKE WEGHTS FOR SCALE CALIBRATIONS

For the purpose of this content, "Make Weights" refers to substitute material.

It would not be reasonable to expect to have sufficient standard weights to test high capacity weighing instruments for example weighbridges.

In some circumstances due to the construction of the weighing instrument it is not possible to load the instrument with standard weights to its full capacity. This is the case with hoppers and similar machines where the load receptor is suspended.

When testing these instruments it is necessary to use "make weights" (substitute material).

1. Load the instrument being tested from zero to the maximum amount of standard weights available to reach the first test point S1.
2. Keep adding weight using small test weights until the display indication changes by just one division. This is change over point. Record the amount of additional weights used to reach change over point, CPW.
3. Unload standard weights from the weighing instrument leaving CPW on the instrument. Use substitution material to reach the same weight indication as with the standard weights and then carefully keep adding substitute material for the indication to change by just one more division (test point plus one more division)
4. Remove CPW from the instrument
5. At this point the instrument being tested is loaded with substitute material to the exact amount of load as with standard weights in S1
6. Add standard weights to reach second test point S2.
7. Use procedures 2 to 4
8. At this point the instrument will be loaded to the amount of S2 with substitute material
9. Keep using same procedures to reach all necessary test points.

Wedderburn Scales Ltd is an established weighing solutions company with over 120 years industry experience.

We are committed to providing products and services which are of a constantly high standard and ensuring these standards are monitored and maintained at all times. Part of that commitment ensures all staff involved in calibration work have appropriate training and qualifications.

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