



eUROPEANiNSTRUMENTS



# Weighing Calibration Guide

A complete guide to understanding our Weighing Calibration  
Service



At European Instruments we offer four different weighing calibration types.  
These are:

- **Full Range**
- **Limited Range**
- **Substitution**
- **Substitution Partial**





## Full Range:

Linearity tests are carried out across the entire range of the instrument from zero to full capacity.

## Performance Tests Carried Out:

- **Linearity:** Across the whole range of the instrument
- **Repeatability**
- **Eccentricity**





## Limited Range:

Linearity tests are carried out from zero to a specified point.

### Performance Tests Carried Out:

- **Linearity:** Linearity tests are carried out from zero to a specified point in the instruments range.
- **Repeatability**
- **Eccentricity**

### Limited Range Example:

A scale may have a capacity of 1000kg but most of the weighing occurs at 500kg. Linearity Tests will be carried out from 0kg to 500kg and not beyond.



## **Substitution:**

Linearity test points are selected throughout the entire range of the instrument using a process of substitution.

## **Performance Tests Carried Out:**

- **Linearity:** Test points are selected throughout the range of the instrument using a process of substitution.
- **Repeatability**
- **Eccentricity**

## **Substitution Process:**

- 100kg of calibration weights placed on scale and reading recorded.
- Weights taken off and substitution weight applied until the same 100kg reading is displayed.
- 100kg weights are then applied and reading recorded at 200kg
- Weights are removed and substitution material applied until a reading of 200kg is reached.
- Process repeated throughout the scale's range.

**(Customer is responsible for providing substitution material)**



## **Substitution Partial:**

Linearity test points are selected from 0kg to 100kg and a selected point in the scales range.

## **Performance Tests Carried Out:**

- **Linearity:** 0-100kg plus a specified point in the instruments range.
- **Repeatability**
- **Eccentricity**

## **Substitution Partial Example:**

- A 2000kg scale used to weigh maximum 1500kg
- Scale performance tested to 100kg
- Tare weight applied at approximately 1450kg
- Linearity checked using engineers calibration weights

**(Customer is responsible for providing suitable tare weight and means to apply to scale)**



## Calibration Types

Calibration Type	Linearity	Repeatability	Eccentricity	Limitations
<b>Full Range</b>	From Zero Point to full range	✓	✓	N/A
<b>Limited Range</b>	From zero point to a specified point in the instrument's range	✓	✓	Linearity of the instrument will not be checked outside specified range Traceability cannot be demonstrated Errors may exist outside specified range
<b>Substitution</b>	Test points are selected throughout the range of the instrument using a process of substitution.	✓	✓	N/A
<b>Substitution Partial</b>	Test points from zero to 100kg + specified point in instruments range	✓	✓	Linearity of the instrument will not be checked outside specified range Traceability cannot be demonstrated Errors may exist outside specified range

**For any queries or further guidance please contact: [Sales@ei.co.uk](mailto:Sales@ei.co.uk)  
Or to speak to one of the team please call: 01865 750375**