



OIML R87

Required equipment and traceability

Average Quantity System inspections may require a variety of specialised equipment to assist the LMO to carry out the their visit efficiently and effectively

- Remember the 5 P's:
 - Perfect Planning Prevents Poor Performance



OIML R87

Required equipment and traceability

Inspection equipment

Make sure the weighing / measuring equipment you take with you is:

- Suitable for the type of goods you are inspecting, and
- Suitably accurate

Required equipment and traceability

Weighing equipment





OIML R87

Required equipment and traceability

Weighing equipment – Guidelines on scale interval size

| Gross Weight (g) of Pre-package | Scale interval (d) in g |
|---------------------------------|-------------------------|
| <25 | 0.01 |
| ≥25 to <1000 | 0.1 |
| ≥1000 to <5000 | 1.0 |
| ≥5000 | 2.0 |



OIML R87

Required equipment and traceability

Weighing equipment – Guidelines on scale interval size

- In general a weighing instrument is considered appropriate if it is verified and the maximum permissible error in service is no more than $0.2 T$ of the prepackage to be tested
- For example, prepackage with nominal quantity of 500 g

$$T = 15 \text{ g and } 0.2 T = 3 \text{ g}$$



OIML R87

Required equipment and traceability

Weighing equipment – Setting up equipment on site

- Find a suitable location
- Convenient to inspection lot / production line
- Safe area; away from moving vehicles etc
- A good working height



OIML R87

Required equipment and traceability

Weighing equipment – Setting up equipment on site

- On a stable and level surface
- Plenty of room for storing sample packages
- Dry, with minimal environmental disturbances



OIML R87

Required equipment and traceability

Weighing equipment – Setting up equipment on site

- Test your weighing equipment on site prior to undertaking the inspection of any prepackage
- If errors are found in your weighing equipment, note the errors and determine if the equipment is suitable

Required equipment and traceability

Weighing equipment – Masses

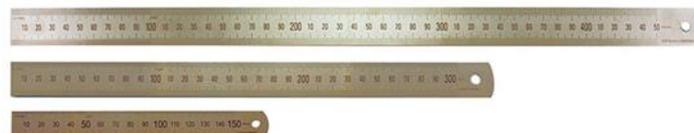
- To verify the accuracy of the weighing instrument
- Appropriate class (M1 or better)
- Suitably accurate
- Traceable to national standards



Required equipment and traceability

Measuring equipment – Length

- Flexible tape measure
- Rigid length measure



Required equipment and traceability

Measuring equipment – Temperature

Thermometer

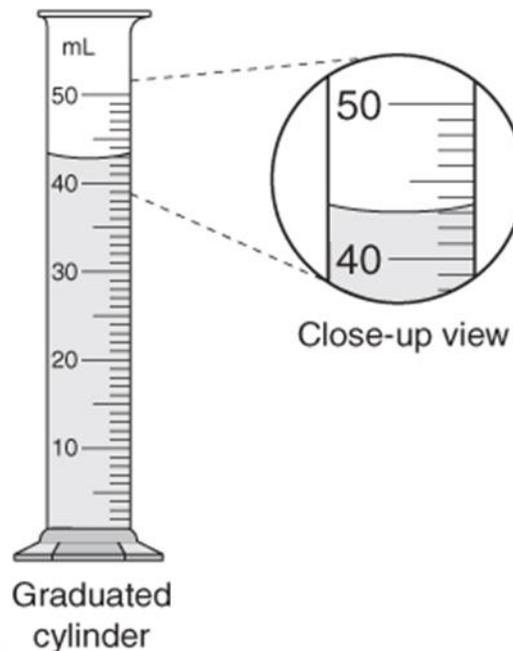
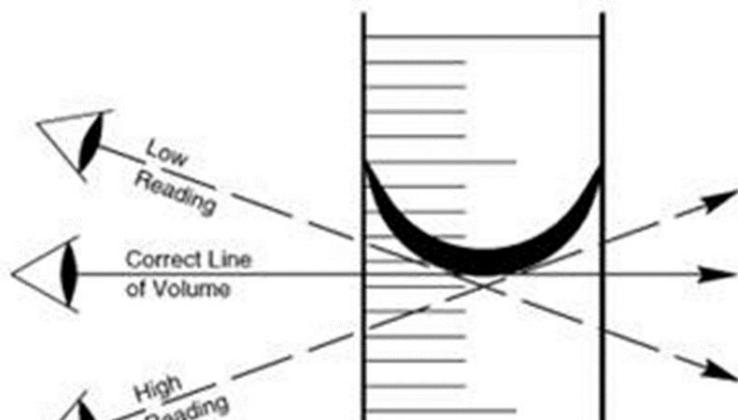
- Measuring the temperature of air or liquid
- Ideally resolution of 0.1 C
- Calibrated and traceable



Required equipment and traceability

Measuring equipment – Graduated cylinder

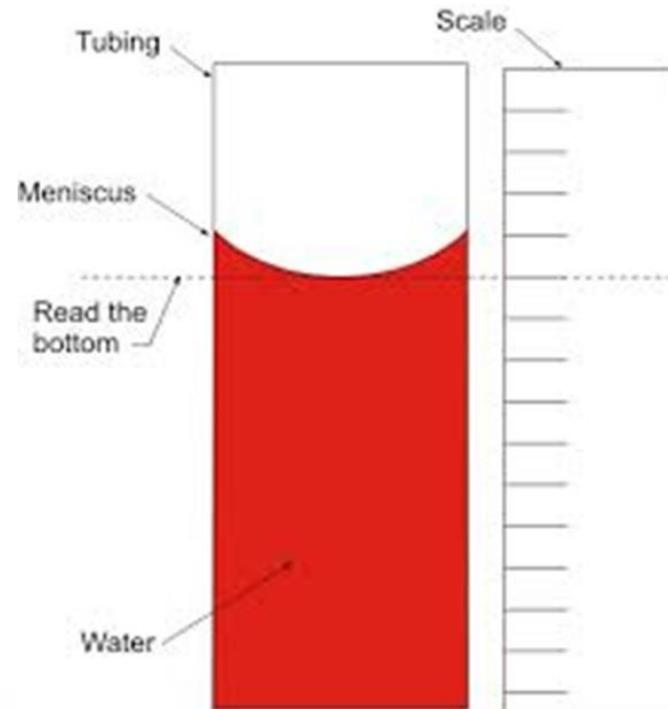
- To measure density or
- Direct volume comparison



Required equipment and traceability

Measuring equipment – Graduated cylinder

- Reading a meniscus
- A meniscus is the curved surface at the top of a column of liquid
- The volume should be read from the bottom of the meniscus.



Required equipment and traceability

Measuring equipment – Hydrometer

- The function of the hydrometer is based on Archimedes principle that a body suspended in a liquid will be buoyed up by a force equal to the weight of the liquid displaced

Thus, the lower the density of the substance, the lower the hydrometer will sink



Required equipment and traceability

Measuring equipment – Hydrometer

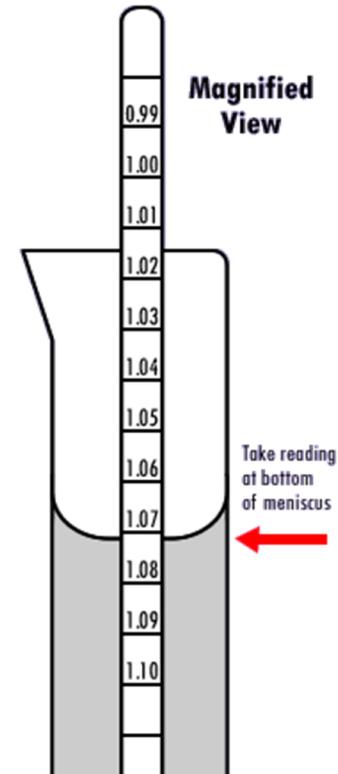
- Used by filling a cylinder with enough product to allow the hydrometer to float
- Carefully lower the hydrometer into the cylinder and gently spin while releasing



Required equipment and traceability

Measuring equipment – Hydrometer

When reading the density from a hydrometer always take the reading at the bottom of the meniscus

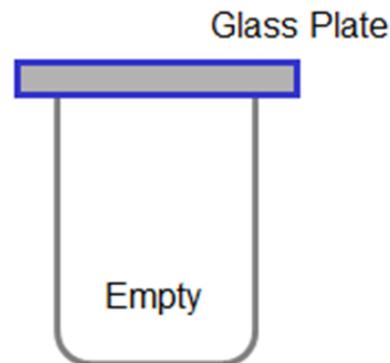


Required equipment and traceability

Measuring equipment – Density cup

Used for determining the density of a liquid

Used with a weighing instrument and traceable masses



Required equipment and traceability

Measuring equipment – Pycnometer

- Glass Pycnometer
- Used for determining density of a liquid
- Used with a weighing instrument



Required equipment and traceability

Measuring equipment – Electronic density meter

- These instruments calculate the density and display it on the digital read out
- Easy to use
- Require only a small amount of product
- Easy to clean



Required equipment and traceability

Other equipment

- Tablet
- Laptop
- Stopwatch
- Calculator
- Camera
- Suitable Personal Protective Equipment (PPE)





OIML R87

Required equipment and traceability

Traceability

Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties



OIML R87

Required equipment and traceability

Traceability

- Metre
- Kilogram

| Unit name | Unit symbol | Quantity name | Dimension symbol |
|-----------|-------------|---------------------------|------------------|
| metre | m | length | L |
| kilogram | kg | mass | M |
| second | s | time | T |
| ampere | A | electric current | I |
| kelvin | K | thermodynamic temperature | Θ |
| mole | mol | amount of substance | N |
| candela | cd | luminous intensity | J |



OIML R87

Required equipment and traceability

Traceability

- Metre; current defined as:
 - The distance travelled by light in vacuum in $1/299,792,458$ of a second
- Kilogram; currently defined as:
 - Being equal to the mass of the international prototype of the kilogram



OIML R87

Traceability – New Zealand

