

## CALIBRATION OF TIPPING BUCKET RAINGAUGES

### INTRODUCTION

Accurate and reliable readings from a tipping bucket raingauge will only be obtained if the gauge is properly maintained and calibrated.

Initial calibration of the raingauge will have been carried out by the manufacturer in ideal laboratory conditions. This note provides information on how to re-calibrate the gauge together with basic maintenance advice.

The calibration recommendations given here are broadly in line with British Standard BS 7843: Section 2.1: 1996 as applied to tipping bucket raingauges.

### PHYSICAL CHECKS

Before attempting to re-calibrate your raingauge, ensure that the gauge is in good working condition as follows:

- a) Make sure that the collector spout and bucket are free of debris. Clean out any debris or sediment from the bucket compartments using a soft brush. When doing this either disconnect the tipping sensor from the datalogger to prevent spurious tips being recorded, or note any bucket tips on the site record.
- b) Ensure that the tipping bucket mechanism and the collector rim are level.
- c) Make sure that the tipping bucket mechanism operates freely. One way to do this is to pour a quantity of water (equivalent to about five bucket tips) into the gauge and listen for the audible sound of the buckets tipping. Again, either disconnect the tipping sensor or note the number of tips in the site record.
- d) Make sure that you know the *exact* volume of water required to tip each bucket.

### RE-CALIBRATION

Two calibration methods can be used, as follows:

1. Slowly drip a *known volume* of water into the gauge, using an accurate burette, and manually

record the volume of water required for each tip. The drip rate should not exceed an equivalent rainfall rate of 10mm per hour. At least 12 tips for each bucket compartment should be made, and the average volume of water for each tip calculated. Any required alteration to the volume per tip can be made by adjusting the bucket compartment stop, and then repeating the calibration process.

2. This method is more complex than the above method, but can achieve a more accurate calibration. Feed a large, accurately known, volume of water (at least 300ml) into the raingauge at a constant rate (approximately equivalent to a rainfall rate of 10mm per hour). Calculate the average volume of water per tip for both compartments by dividing the volume of water by the number of tips. Use two separate containers to collect the water that has passed through each bucket compartment. Check the two separate volumes of water to ensure that the buckets are tipping at near-identical values. If the volume per tip for either of the two bucket compartments is outside 98% to 102% of the specified value for that gauge, adjust the appropriate bucket stop(s) and repeat the calibration procedure.

### MAINTENANCE OF RAINGAUGES

The frequency of maintenance visits will depend on local site conditions, but it is recommended that site visits should be made at least every two weeks.

Keep grass or other vegetation surrounding the gauge short, and if there is a collar of stone chippings around the gauge, keep it weed free. Keep any vegetation deliberately planted to provide a windbreak at exposed sites properly maintained to retain the correct exposure conditions. This includes maintaining the correct shape and construction of a turf wall installation. Collect and dispose of any windblown debris.

Inspect any site fencing for loose posts, damaged wire, damage to gates or locks etc. This is especially necessary on sites subject to vandalism, or where the gauge needs to be protected from animals or livestock.