



**HIGHWAYS DEPARTMENT**

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**GUIDANCE NOTES**

**Approval of Private Laboratories  
to Perform Design Testing of Bituminous Mixes**

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**Guidance Note RD/GN/006B**  
**Approval of Private Laboratories**  
**to Perform Design Testing of Bituminous Mixes**

In April 1989, Highways Department implemented a centralised mix design vetting system. The procedures of the system were promulgated under Highways Department Technical Circular 4/89.

The General Specification requires the Contractor to carry out the design of bituminous materials at a laboratory approved by the Engineer. The purpose of this Guidance Note is to set down the minimum standards required for a laboratory to be approved for the performance of design testing of bituminous mixes, in accordance with the Specification and the above described Technical Circular.

The laboratory staff, operating systems and environment etc. should be of acceptable standard. Since the whole ( or at least most ) of the mix design will be witnessed by PWL/R&D staff under the above system, checking will be concentrated on the suitability and calibration of equipment, and records of such calibrations initially. This Guidance Note lists out details of such requirements. It should be noted that:

approval under this Guidance Note does not  
constitute general approval of the laboratory to  
perform compliance or other testing.

The Laboratory concerned shall satisfy the Research and Development Division that the laboratory staff are conversant with the mix design procedures, competent in performing them and the equipment used, is in a suitable condition and complies fully with the requirements of this Guidance Note. Calibration certificates issued either by a laboratory accredited by HOKLAS or in-house calibrations permitted by HOKLAS for the relevant test (or a laboratory recognised by HOKLAS under mutual recognition agreement), shall be sent to the Research and Development Division for examination every six months. The date of calibration, the type of calibration device used and identification number of the devices shall be given where relevant. Reports shall be properly signed by an authorized signatory, with the name and post clearly printed. For administrative convenience, calibration certificates together with a summary on the calibration of laboratory equipment shall be forwarded to the Research and Development Division by 1st January and 1st July respectively each year.

Calibration results should be presented formally, accompanied by a letter from the design testing laboratory, on paper bearing the company's address and logo.

## Calibration Requirements

| Type of equipment   | Recommended period between successive calibrations/checking   | Calibration/Checking procedure and equipment requirement   |
|---|---|--|
| Balances and scales   | <p>Three years</p> <p>Three years</p> <p>Either alternative accompanied by</p> <p>(i) Each weighing</p> <p>(ii) One month</p> <p>(iii) Six months</p> | <p>By a HOKLAS accredited calibration authority</p> <p>or</p> <p>calibrate using certified masses in accordance with CSIRO Division of Applied Physics paper 'Calibration of Balances' by D.B. Prowse (1985)</p> <p>(i) Zero check</p> <p>(ii) One-point check using a known mass near balance capacity</p> <p>(iii) Repeatability check</p> |
| Dial gauges   | Two years   | BS 907   |
| <p>Length measuring devices :</p> <p>Working rules and vernier calipers</p> |   | Rules and vernier calipers from reputable manufacturers may be used without calibration except that in the case of callipers, a zero point check shall be performed before each use  |
| Drying ovens  | <p>Five years</p> <p>One year</p>   | <p>Temperature variation in accordance with AS2853 (1986)</p> <p>Check the temperature at the centre of usable oven space with a thermocouple and compare with the setting temperature for the working temperature range of the oven.</p>  |
| Linear variable differential transducers (LVDT)                             | Two years (complete calibration)  | Check against length standard such as a micrometer   |

| Type of equipment  | Recommended period between successive calibrations/checking                            | Calibration/Checking procedure and equipment requirement   |
|--|--|--|
| <u>Marshall equipment</u><br>a. Hammer<br>Mass, dimensions, height of drop<br>b. Testing machine<br>Rate of strain<br>c. Testing head<br>Dimensions<br>d. Mould<br>Dimensions<br>General condition | One year<br><br>One year<br><br>Six months<br><br>Six months<br>Before each mix design | BS 598 : Part 107 : 1990   |
| Pressure and vacuum gauges   | Six months   | BS 1780:Part 2:1985  |
| Proving rings  | One year   | By a dead weight tester in conjunction with a calibration rig in accordance with manufacturers' instructions. The grading of the proving ring shall be based on NAMAS Publication B0415  |
| Sieves   | Before each test<br><br>One year<br><br>Six months                                     | Visual checking for damage and clogging<br><br>Check the apertures of perforated plate test sieves in accordance with appendix F of BS410 : 1986.<br><br>Check the performance of woven wire cloth test sieves against a set of master sieves in accordance with BS 812: Part 100 : 1990.<br>(Sieves may be used without initial calibration if from a reputable manufacturer and supplied with a manufacturer's calibration certificate confirming compliance with BS410:1986 ) |

| Type of equipment   | Recommended period between successive calibrations/checking | Calibration/Checking procedure and equipment requirement  |
|---|---|---|
| Masses<br>Reference masses of integral construction, stainless steel or nickel chromium alloy | Five years initial; Ten years subsequent                    | By a HOKLAS accredited calibration authority or equivalent  |
| Reference thermometers (Liquid-in-glass)  | Ten years   | By a HOKLAS accredited calibration authority or equivalent  |
|   | Six months  | TELARC Technical Note No.6<br>Ice point or one-point check  |
| Working thermometers (Liquid-in-glass)  | Initial Check   | TELARC Technical Note No.6<br>Check against a calibrated reference thermometer at sufficient points to cover expected working range |
|   | Six months  | TELARC Technical Note No. 6<br>One point check, e.g. ice point or the temperature at which the thermometer is most frequently used. |
| Thermocouples<br>a. Reference   | Three years (complete calibration)                          | BS 1041:Part 4; BS4937;<br>ASTM E200; ASTM E230   |
| b. Working  | Six months  | One point check against a reference thermometer   |
| Timers (Stopwatches and timing devices)   | Three months  | Check against time signal given by (RTHK) for at least half an hour. (Timers shall be accurate to 1 second within 5 minutes)        |
| Water baths   | Six months  | Relate temperature of water and setting using a reference thermometer.  |