

PUDDLE CLAY SPECIFICATION

1) General

Material to be used as puddle clay shall be naturally occurring homogeneous plastic material. It shall be free from deleterious matter such as sand, stones and organic material. The use of lime-stabilised clays shall not be allowed.

2) Properties

- a) More than 65% of the natural material shall be finer than 0.06mm and more than 40% shall be finer than 0.002mm
- b) The natural material shall be defined as firm clay in accordance with BS5930:1981 Table 8 (C_u 40-75 kPa).
- c) The natural material shall be defined as clay of intermediate to extremely high plasticity in accordance with BS5930:1981, figure 31 and the liquid limit shall not be less than 35%.
- d) The coefficient of permeability (k) of the remoulded material shall not be greater than 10^{-9} m/s.
- e) The remoulded material shall be defined as Non-dispersive (ND1) in accordance with BS1377:Part 5:1990, Table 2.

3) Identification

An indication of a material's suitability may be obtained from the following *empirical* tests, at the moisture content agreed for placement.

a) Tenacity Test

A 300mm long, 25mm diameter cylinder of clay is held vertically for 15 seconds so that at least 200mm is unsupported and in tension under its weight. If the cylinder breaks the clay will be rejected as unsuitable.

b) Pinch Test

A 75mm diameter ball of remoulded clay is squeezed into a 25mm thick flat disc. If any cracks appear the clay may be rejected as unsuitable.

c) Slaking Test

A 50mm diameter ball of remoulded clay is placed in a 600ml beaker and covered with water. If the ball disintegrates within 24 hours the clay may be rejected as unsuitable.

d) Permeability Test

A sample of remoulded clay shall be formed into a tray to hold 20 litres of water and the loss measured after 24 hours. This shall be compared with the water loss from a metal tray of the same surface area holding the same quantity of water. If the difference is greater than 1% the clay may be rejected.

4) Acceptance

- a) A representative sample of the proposed clay material, not less than 10kg in weight together with appropriate tests results shall be supplied to the Engineering Manager for his acceptance not more than two weeks after acceptance of the Tender, and at least four weeks in advance of any proposed change in source or quality of the material.
- b) Test results to BS1377 are required as follows:
 - i) Grading
 - ii) Liquid and Plastic Limits
 - iii) Natural Moisture Content
 - iv) Coefficient of Permeability of remoulded clay
 - v) Pinhole Dispersion of remoulded Clay
 - vi) Compaction (2.5kg rammer)

5) Emplacement

- a) The clay should be reworked in a stockpile on site and water added as necessary to destroy the original structure of the clay and produce a smooth plastic homogeneous puddle clay with a moisture content of a minimum of 1.3 times the plastic limit. Reworking of the clay should be carried out in such a manner as to prevent contamination.
- b) The method of placing the clay shall be agreed by the Engineering Manager before work commences. Whatever means are adopted they shall produce a continuous homogeneous plastic mass of puddle clay effectively free from voids, laminations or imperfections which could affect its water retaining properties.
- c) The clay shall be placed in horizontal layers not exceeding 150mm consolidated thickness and compacted by an approved method to an air void content not exceeding 5%.
- d) Unless agreed otherwise with the Engineering Manager, the type of compaction plant and number of passes shall conform with the requirements of Clause 608 and Tables 6/1 and 6/4 for material Class 7C (selected wet cohesive material) of the DoT specification for Highway Works Part 2.
- e) Before placing a further layer of puddle, the surface of the previous layer shall be cleansed of all slurry and surplus water and the surface prepared to ensure that the clay to be placed shall be integrated with that already placed. Preparation of surfaces between successive layers shall be formed by frequent non-continuous spade cuts into the upper surface of the clay to depth of 75mm.
- f) Where clay puddle is to be joined with existing clay puddle, the existing clay shall be cut back and stepped to form a good key between the existing and new clay puddle over a distance to be agreed by the Engineering Manager, but not less than 1000mm. All trace of junction marks shall be wholly eliminated.
- g) Precautions shall be taken to ensure any puddle clay awaiting placing, puddle clay which has been placed and any puddle clay in dry areas shall be kept continuously wet to prevent it drying out and covered by waterproof sheets to protect it from rain damage. Precautions shall be taken to prevent the material freezing.