

- B. The material used for packing to withstand all imposed loading applied during the installation of all pipes for each completed length without showing signs of deterioration or distress.

#### **1.2.4 Lubricating Fluid**

It is envisaged that lubricating fluid shall be one of the following but the final choice of fluid will be the responsibility of the Contractor to the approval of the Engineer. Lubricating fluid shall generally be a polymer or bentonite based slurry lubrication material. In suitable ground conditions water alone may be used. For clay soils, non-aqueous lubricants shall be used.

#### **1.2.5 Joint Seal**

The joint seal shall comprise one or more elastomeric rings complying with BS EN 681-1.

#### **1.2.6 Grout**

- A. As over break grouting Portland cement and water as determined by geotechnical data and directed by the Engineer. Its nominal strength shall be at least 20N/mm<sup>2</sup>. Admixtures shall be used only if tests have shown to the satisfaction of the Engineer that their use improves the properties of the grout, e.g. by increasing workability or slightly expanding the grout.
- B. As annular space filling a low strength grout or foam concrete shall be used and placed at low pressures. The density of the mix shall be in the range of 900 to 1200kg/m<sup>3</sup> and the free water/cement not greater than 0.6.
- C. As cavities grouting Portland cement, Portland cement/sand or Portland cement/bentonite mortars as determined by ground investigation data.

### **1.3 Part 3 Execution**

#### **1.3.1 General**

- A. The Contractor shall confine surface operations to pits/shafts and the area immediately adjacent to such shafts. He shall keep the working area to the minimum practicable for the proper construction of the works.
- B. The Contractor shall take any measures necessary to prevent damage or deterioration of the soil reaction face during the construction of the temporary and permanent works from whatever possible cause, such as ingress of water, softening, corrosive soil or loss of fines from a granular soil.

#### **1.3.2 Examination**