

SPECIFICATION FOR WATERTIGHTNESS OF BASEMENT STRUCTURES

1.0 GENERAL REQUIREMENTS

The Contractor shall be completely responsible for the supply and proper installation of the specified or approved waterproofing system to make the basement structures including diaphragm walls, basement slab, lift pits, R.C. retaining walls and R.C. water tank absolutely watertight. The proposed waterproofing system and its method of construction shall be subject to the Engineer's approval. All waterproofing material shall be new and shall comply with the specified material requirements. The Contractor shall produce testing certificates to verify that barrier material is suitable for the end use intended.

The Contractor shall engage a qualified waterproofing specialist to supply, install and protect the full waterproof barrier system, all accordance with the barrier manufacturer's recommendations. The waterproofing specialist shall be approved by the Engineer and shall be selected on the basis of past track record, technical reliability, capability and willingness to supply technical assistance, and reputation for standing behind his product and work.

The Contractor is at liberty to submit either a proprietary membrane of waterproofing system or a chemical grouting system or a combination of both. The Contractor are required to submit complete details and specification of the waterproofing system being offered at time of tendering. Any alternative system offered after the award of tender would be strictly at the discretion of the Employer and the Engineer.

2.0 PERFORMANCE GUARANTEE

The Contractor shall give a ten (10) years guarantee for watertightness of the structure effective from the date of completion of the whole works. The form of guarantee shall be to the satisfaction of the Employer/Engineer.

Should any leak, moist lines, points or patches occur during the guarantee period of 10 years the Contractor shall immediately carry out the necessary remedial works restore the watertightness of the structure at no extra cost to the Employer/Engineer.

The Contractor shall make good damages to all finishes (such as plaster, paint, panelling, tiling, etc.) electrical or other installations, or other property, caused by water leakage or dampness.

3.0 CHEMICAL GROUT MEMBRANE WATERPROOFING SYSTEM UNDER BASEMENT SLAB

Chemical Grout Membrane Waterproofing Systems shall include the following:-

- (a) Polythene Membrane
A layer of clear polythene membrane gauge 1000 (0.25mm thick) lapped 200mm at joints and taped with a waterproofing tape - laid on lean concrete.
- (b) Porous Layer
40mm layer of 10mm to 30mm graded aggregate as porous layer.
- (c) Protective layer
20mm thick 1:5 cement and sand and screed rendered over the porous layer.

The reinforcement concrete basement slab will only be cast after the waterproofing specialist

has installed grout vent formers for later pumping of chemical cement grout through these vents into the porous layer below the slab. The grout is to comply with the following minimum Specifications:

Minimum compressive Strength 40 N/mm^2
Permeability Coefficient $K = 1 \times 10^{-8}$

4.0 WATERPROOFING FOR BASEMENT WALL, LIFT PITS AND RC WATER TANK

Water to internal surfaces of R.C. walls, lift pits and water tank shall be "Vandex" waterproofing system or equivalent of a type and design approved by the Engineer. The waterproofing system shall be installed by manufacturer's agent approved by the Engineer and strictly in accordance with the specifications and manufacturer's recommendation. The "Vandex" material shall be mixed in accordance with the manufacturer's instructions. The "Vandex" slurry coatings shall be applied with stiff masonry brush or stiff broom, and work into every irregularity of the surfaces. One coat of "Vandex Super" shall be applied to the prepared surface at a coverage rate of 1.0 kg/m^2 followed by second coat of "Vandex Premix" at a coverage rate of 1.0 kg/m^2 whilst the first coat is still green.

5.0 SUBMITTALS

The Contractor shall provide the Engineer/relevant approving Authority method statement together with comprehensive shop drawings showing all details and procedures of construction for the relevant parts of the works in a timely sequence. Details to be submitted shall included but no limited to the followings:

- (a) surface preparation,
- (b) construction sequence and coverage by each stage of works,
- (c) equipment used,
- (d) grouting pressure applied and its procedures,
- (e) corner details etc.

Reasonable time should be allowed for checking by the Engineer in programming the production of shop drawings and method statements. Delays caused by the late submission of shop drawings or repeated amendments of drawings due to inadequate or inaccurate drawings will not be recognised as a reason for extension to the contract time.

The manufacturer's standard application details shall be used only as a guide for the preparation of shop drawings. The Contractor is deemed to have taken due consideration of the particular requirements of this contract based on the tender documents. Where necessary, the Contractor based on the tender documents. Where necessary, the Contractor is expected to improve upon the manufacturer's standard details to suit the project requirements and such amendments shall be shown in shop drawings for approval by the Engineer. The Contractor shall not be entitled to extra contract cost and/or time in this respect.

6.0 CONSTRUCTION JOINTS

All joints in the basement wall/retaining wall and basement slab are to be provided with minimum 250mm wide heavy duty PVC waterstop. Installation of waterstops shall be strictly in accordance with the manufacturer's instructions and to the satisfaction of the Engineer. The material for PVC waterstop shall conform to the following requirements:

- (a) Form : Extruded thermoplastic sections

(b)	Solids content	:	100%
(c)	Tensile properties	:	14.0 MN/m ² minimum
(d)	Elongation at break	:	300% minimum
(e)	Softness	:	To BS 2782 at 25°C
(f)	Hardness Shore `A'	:	80 -90

All joints are to be well cleaned, and the surface layers are to be hacked or bush-hammered away until sound concrete is reached. The horizontal joints in walls are to be covered with 50mm thick layer of sand/cement grout in the proportion of 1 part cement to 1 part concreting sand, at the start or next concreting. Horizontal construction joints will be permitted in basement slab unless approved by the Engineer.

The Contractor is required to carry out the epoxy grouting of all construction joints (by Grouting Specialist) irrespective of whether they leak or not (i.e. it is compulsory) in order to ensure lasting watertightness. The layout of the grout holes to construction joints together with comprehensive shop drawings showing all details and procedures for the proposed grouting works are to be submitted to the Engineer for approval. The Contractor shall be solely responsible for the proposed system.



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