

**CONSTRUCTION STANDARD FOR
UNDERGROUND DISTRIBUTION
NETWORK****PART 13: ROOF AND DOOR CANOPY
WATERPROOFING SYSTEM**

Issue Date: 08 - 2019

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DISTRIBUTION NETWORK
PART 13: ROOF AND DOOR CANOPY WATERPROOFING
SYSTEM**

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1 Introduction

This construction standard specifies the method and technical requirements of roof and door canopy waterproofing system. This method is intended to assist the field engineers and contractor to achieve uniform construction practices and ensure a satisfactory and economical level of service.

2 Revision and addition

This construction standard is subject to revision as new materials and methods of construction are developed. The latest revision of this construction standard shall be applicable.

3 Service condition and system parameters

For construction and installation of Roof and Door Canopy waterproofing system, the service condition and system shall be given in the latest revision of SEC General Requirements for all Equipment/Material Specification No. 01-SDMS-01.

4 Materials and Requirements of Waterproofing System

4.1 General

4.1.1 Roof and Door Canopy waterproofing system shall be constructed accordance with standards drawing (see detail 1, detail 2 and typical detail of door canopy).

4.1.2 Roof shall be provided with a waterproofing membrane which can be 1 (one) layer of PVC 1.5mm thick or 2 (two) layer of Elastomeric Bituminous 4mm thick each.

4.1.3 The waterproofing membrane specification shall be in accordance with **PTS No. 1 Rev. (0) Structural/Civil Design Criteria, Technical & Material Specification for Construction of 33/13.8kV S/S, Clause 3.11.**

4.1.4 CONTRACTOR shall submit samples and brochures of the product for COMPANY review and acceptance.

4.1.5 Waterproofing membrane shall be installed by the manufacturer, or on his behalf, by profession waterproofing CONTRACTOR approved by the manufacturer, acceptance to the COMPANY.

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4.1.6 The waterproofing material and the installation of the membrane shall be guaranteed for a minimum period of ten (10) years.

4.2 Materials

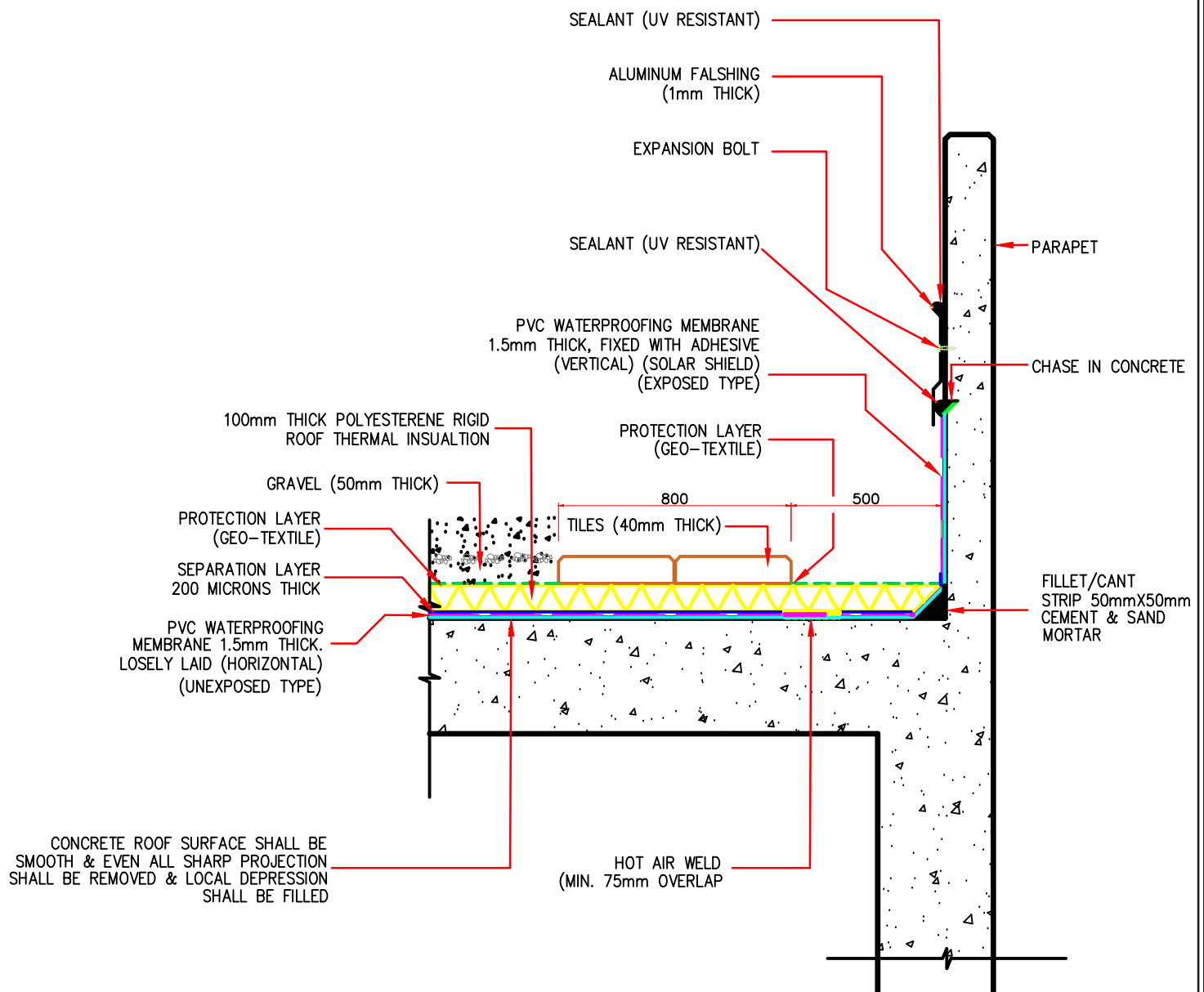
4.2.1 Roof Waterprofing with PVC Membrane

Item No.	Description	Requirements/Specification
1	Concrete Roof	The concrete surface should be even and smooth. All sharp projection shall be knocked down and local depression and sudden changes shall be filled with high strength mortar to present a true surface.
2	PVC Waterproofing Membrane, 1.5mm thick, loose-laid (horizontal)	Joints shall be welded together using hot air gun.
3	PVC Waterproofing Membrane, 1.5mm thick, fixed with adhesive (vertical) (Solar shield	UV resistant/stabilized bonded to parapet wall and terminated at the groove/chase. Exposed application
4	Adhesive	Special suitable for hot and humid climate
5	Hot Air Weld	The horizontal and vertical membrane shall be welded (minimum overlap 75mm).
6	Separation Layer	200 micron polyethylene sheet
7	Roof Thermal Insulation	Rigid extruded polystyrene board, have a "U" factors of not greater than 0.34W/m ² -oK
8	Protection Layer	Non-woven, geotextile made from polyester or propylene fibers, 2mm thick and weighing 300g/m ²
9	Gravel	50mm thick
10	Sealant	UV resistant
11	Aluminum Flashing	50mm x 1mm thick with four bends fixed with screws.
12	Cement Mortar	Under tiles (25mm thick)
13	Tiles	Walkway 800mm wide, loose laid precast concrete tiles (400mm x 400mm x 25mm).
14	Fillet/Cant Strip	50mm x 50mm sand and cement mortar strip should be made along the intersection of horizontal and vertical surfaces.

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DETAIL - 1 : PVC WATERPROOFING MEMBRANE (WITH THERMAL INSULATION)

ALL DIMENSION ARE IN MILLIMETER

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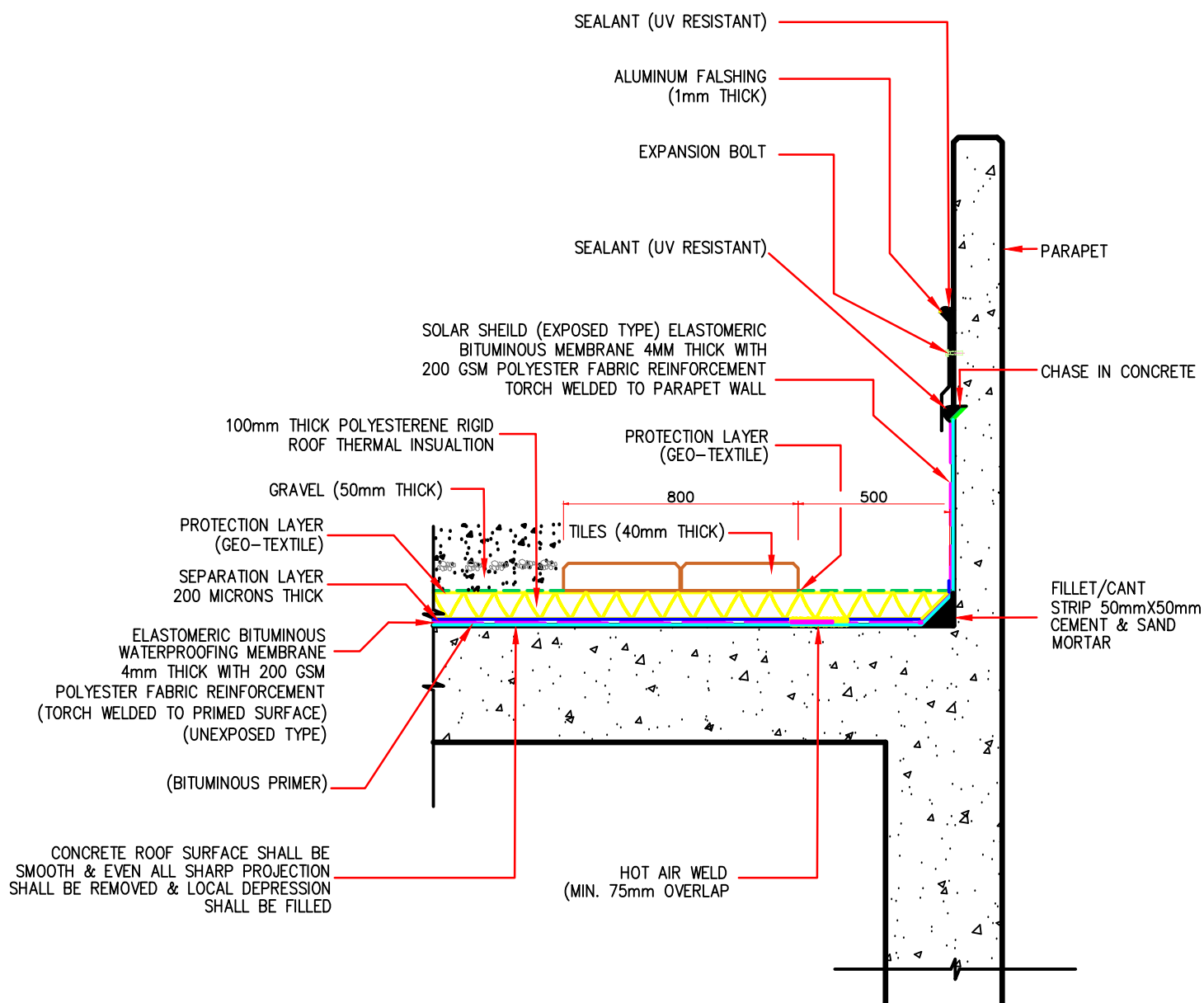
4.2.2 Roof Waterproofing with 4mm thick Elastomeric Bituminous Membrane

Item No.	Description	Requirements/Specification
1	Concrete Roof	The concrete surface should be even and smooth. All sharp projection shall be knocked down and local depression and sudden changes shall be filled with high strength mortar to present a true surface.
2	Primer	Concrete surface shall be dry before application of primer. Primer must not be poured onto the surface & care must be taken to avoid "pounding" in depression.
3	Bituminous Membrane, 4mm thick 200 gsm polyester fabric reinforcement	The membrane shall be installed using torch welding method and on application. Fully adhered to the primed surface for the horizontal and vertical surfaces. The joint shall be welded by torch welding method.
4	Bituminous Membrane, 4mm thick 200 gsm polyester fabric reinforcement	The membrane shall be loose laid over the membrane describe in item 3. The longitudinal and end lap joints shall be welded by torch welding method.
5	Solar shield Bituminous Membrane, 4mm thick with 200 gsm polyester fabric reinforcement	Granular surface for exposed application.
6	Separation Layer	200 micron polyethylene sheet
7	Roof Thermal Insulation	Rigid extruded polystyrene board
8	Protection Layer	Non-woven, geotextile made from polyester or propylene fibers, 2mm thick and weighing 300g/m ²
9	Gravel	50mm thick
10	Sealant	UV resistant
11	Aluminum Flashing	50mmx1mm thick with four bends fixed w/screw
12	Cement Mortar	Under tiles (25mm thick)
13	Tiles	800mm wide, loose laid walkway made up of precast concrete tiles (400mmx400mmx25mm)
14	Fillet/Cant Strip	50mm x 50mm sand and cement mortar strip should be made along the intersection of horizontal and vertical surfaces.

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DETAIL - 2 : BITUMINOUS WATERPROOFING MEMBRANE (WITH THERMAL INSULATION)

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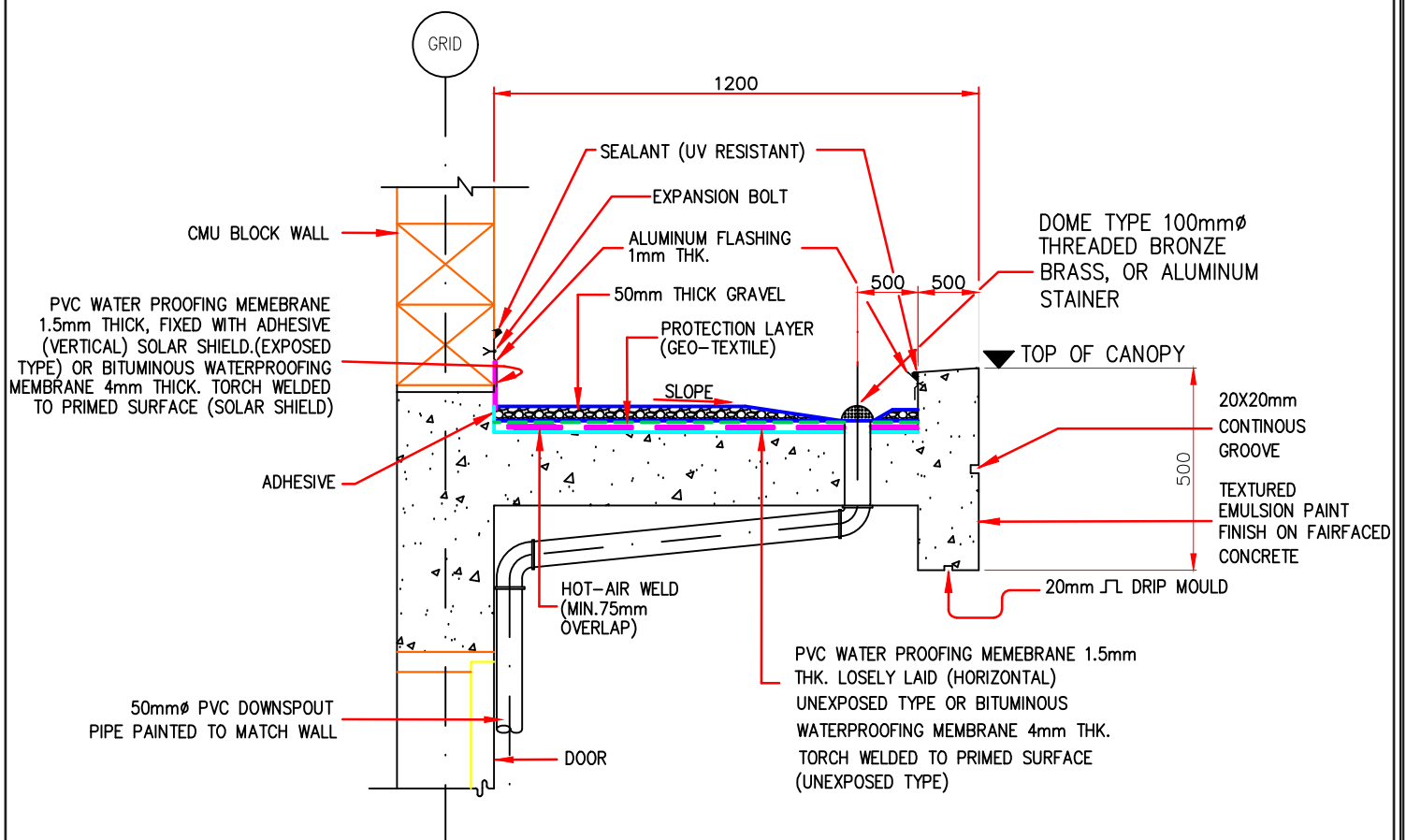
**4.2.3 Door Canopy Waterproofing with one “PVC” or one “4mm Thick Bituminous”
Membrane**

Item No.	Description	Requirements/Specification
1	Concrete Canopy	
2	Cement sand screed	Screed surface should be even and smooth
3	PVC waterproofing membrane, 1.5mm thick, horizontal loose laid and vertical fixed with adhesive Or Bituminous membrane, 4mm thick with 200gsm polyester fabric reinforcement	Terminate at the groove/chase. Joints shall be hot welded. Torch welding method. Terminate at the groove/chase.
4	Adhesive	Application suitable for hot and humid climate (applicable for PVC membrane)
5	Gravel	50mm thick
6	Protection Layer	Non-woven, geotextile made from polyester or propylene fibers, 2mm thick and weighing 300g/m2
7	Sealant	UV resistant
8	Aluminum Flashing	50mm x 1mm thick with four bends fixed with screws.
9	Fillet/Cant Strip	50mm x 50mm sand and cement mortar strip should be made along the intersection of horizontal and vertical surfaces.

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TYPICAL DETAIL OF DOOR CANOPY WATERPROOFING

ALL DIMENSION ARE IN MILLIMETER

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5 Construction Method

5.1 Surface Preparation – Clean the surface thoroughly free from loose materials, dust and oil. Surface cleaning plays a vital role in all membrane based waterproofing coating system to ensure proper adhesion of the membrane with the base surface.

5.2 Primer Coat – Apply a primer prior to the application of Bituminous Roofing Membrane.

5.3 The adhesive for the PVC membrane shall be recommended by the manufacturer.

5.4 Unroll the membranes sheets – check for the correct alignment and adjust whenever required. No wrinkles should be allowed while laying the membranes.

5.5 Press the membranes firmly ensuring proper bonding with the concrete surface. Additional care should be taken for overlaps, edges and at angles to ensure proper bonding.

5.6 Heat with a torch the burn-off film present at the underside face of the membrane.

5.7 The torch fire should be applied uniformly and slow over the roll while laying.

5.8 Check all the edges of joints properly to ensure proper adhesion of ends laps membrane, air gaps is not acceptable.

5.9 Overlapping of PVC shall be 75mm (minimum).

5.10 Water Flood test – Impounding water over the roofs for at least Seventy Two (72) hours to check water leakage.

5.11 Separation layer laying

5.12 Polystyrene boards (Thermal Insulation) are fixed on top membrane after the separation.

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5.13 Geo-Textile membrane shall be laid as a protection layer over the entire roof area.

5.14 Between the levels, the protection of waterproofing vertical edges is provided by metal section (aluminum flashing) used as water drip.

5.15 The metal section is nailed to the vertical wall and its upper part is sealed using elastic sealer (sealant).

5.16 The application of gravel was shown on the details drawing.

5.17 Laying of tiles as shown on the detail drawing.

5.18 Care should be taken in every method of construction.

6 Testing

6.1 CONTRACTOR shall carry out water flood test for at least seventy-two (72) hours by impounding water over the roofs to check the adequacy of waterproofing.