COMBO ROOF PLUS

Method Statement

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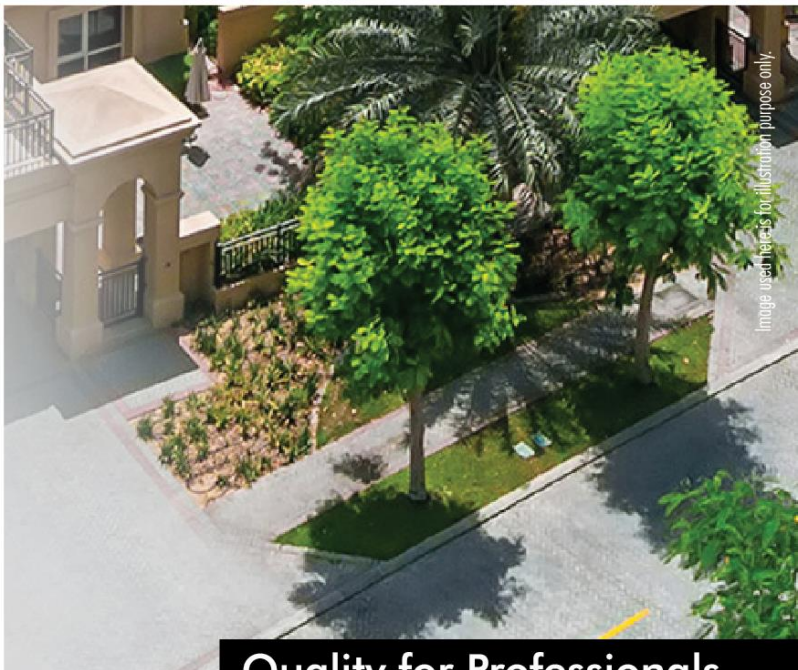

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Quality for Professionals

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1. Products and System Description

1.1. System Description

Combo Roof Plus is a build-up roof waterproofing and insulation system offering UV protection, and an elevated Solar Reflectance Index (SRI > 95%) suitable for all types of flat roofs. Combo Roof Plus consists of high-density spray applied rigid Polyurethane foam, protected by a UV rated waterproofing coating, a geotextile separation layer and fiber reinforced screed concrete in panels with a finishing SRI rated protective acrylic top coating having high energy efficiency.

1.2. Areas of Application

Combo Roof Plus system is designed for the following structures:

- Flat roofs (Commercial and residential buildings, individual and group villas)
- Balconies
- Terrace area of newly constructed buildings

1.3. System Components

The Combo Roof Plus system comprises of the ten following products:

1. Polyfoam SS 45 – Two Component (MDI & Polyol) Spray Applied Polyurethane Foam
2. Polyflex Combo – Acrylic Modified Elastomeric Cementitious Waterproofing and Protective Coating
3. Separation Layer – Geotextile Filter Membrane (Outsource)
4. Polyboard – Bitumen Impregnated Compressible Fiber Filler Board
5. Screed Concrete – Protective Fiber Reinforced Screed Concrete (Outsource)
6. Rushbond PVA – Polyvinyl Acetate Based Bonding Agent
7. Polyrod – Closed Cell Polyethylene Backing Rod
8. Polyseal PS PG – Two Part Pouring Grade Polysulphide Joint Sealant
9. Fabric Reinforcement – Canvas Fabric (Outsource)
10. Polycryl PF – Single Component UV Resistant Acrylic Waterproofing and Protective Coating

1.3.1. System Components Supply

	Package	Size (mm)	Volume (L)	Weight (kg)
Polyfoam SS 45 Part A (Polyol)	Drum	-	-	220
Polyfoam SS 45 Part B (MDI)	Drum	-	-	250
Polyflex Combo Part A (Powder)	Bag	-	-	10
Polyflex Combo Part B (Liquid)	2 Pails	-	5/pail	-
Polyboard	Board	12, 15	-	-
Polyrod	Roll	15, 20	-	-
Rushbond PVA	Pail	-	5, 20, 200	-
Polyseal PS PG	Pail	-	4	-
Polycryl PF	Pail	-	25	-

1.3.2. Product Details

a) Polyfoam SS 45

Polyfoam SS-45A is a HCFC blown & CFC free, two-component polymeric M.D.I based system for producing rigid urethane foam, that serves as the thermal insulation layer and creates a seamless, monolithic barrier against water vapor and air.

b) Polyflex Combo

Polyflex Combo is a two-part acrylic modified cementitious waterproofing coating for protecting the polyurethane foam layer against UV exposure. It cures to form a tough flexible coating having excellent waterproofing properties. Polyflex Combo is a blend of cement, selected fillers, polymers and graded silica sand, which is in the powder form.

c) Polyboard

Polyboard is a compressible bitumen-impregnated fiber board made from natural wood fibers, offering excellent recovery for use in joints when fixing ridges in panels.

d) Polyrod

Polyrod is a closed cell, nonabsorbent and chemically inert polyethylene foam flexible rod. Polyrod is designed for use as a compressible joint backing material for the polysulphide joint sealant.

e) Polyseal PS PG

Polyseal PS PG is a two-component pourable, self-leveling polysulphide resin based joint sealant. Polyseal PS PG is specifically designed to be used as a watertight seal for moderate movement and control joints in horizontal areas. The cured sealant has good resistance to most environmental chemicals & resists deterioration on prolonged exposure to UV.

f) Polycryl PF

Polycryl PF is a single component, acrylic waterproofing and protective coating with outstanding resistance to water and moisture. It is specially designed for roof coating applications with a high solar reflectance index (SRI > 95%). Once cured, Polycryl PF forms a tough, flexible, and durable coating layer that exhibits exceptional resistance to UV rays and other weathering agents.

2. Required Installation Tools/Equipment

For the installation of Combo Roof Plus the following tools/equipment is required:

1) Spray polyurethane foam machine reactor
2) Survey equipment-level and total station
3) Air compressor, grinder
4) Hand tools, such as pliers, hand saw, wire cutter brush, rollers, etc.
5) Line dory, measuring tape
6) Aluminum float, power float, bench saw, hand saw, trowel
7) Concrete pump and supply
8) Mandatory PPE with safety harness & lifeline as applicable

3. Safety Instructions

For the installation of Combo Roof Plus, there isn't specific safety equipment requirement, however, personal protection equipment is mandatory in any construction site.

- PPE should be worn at all times (safety shoes and gloves, mask, goggles, Helmet etc).
- Suitable eye protection should be worn at all times, specially while handling products in liquid form.
- If any product gets in contact with skin or eyes, rinse with fresh water immediately and seek medical advice.
- In case of accidentally any product is swollen, call medical assistance immediately.

4. System Installation

4.1. Substrate Preparation

4.1.1. General Instructions

For the application of Combo Roof Plus, it must be ensured that the substrate is cleaned thoroughly of all contaminants. Additionally, the following must be followed:

- All existing joints between roof slabs, except expansion joints, shall be filled properly with concrete filler material/mortar.
- Clean the substrate from any debris, such as oil and/or dust.
- All surface imperfections, protrusions, structurally unsound and friable concrete must be removed and repaired with a suitable concrete repair mortar from the Polycrete range (depending on the size of the damage).
- Rainwater outlets shall be installed at the specified height as indicated in the Section drawings. The outlet height, from the surface level, should be 10mm less than the proposed foam thickness.
- A threshold of adequate height shall be installed at the roof access, in accordance with the system thickness.
- All necessary service sleeves must be installed at a minimum height of 400mm.
- Nail heads and any other protrusions must be either removed or grinded down.
- The area must be cleaned using compressed air to remove any loose particles.
- It is recommended to cover the parapet wall (with a minimum height of 75cm) and other utilities fixed on the roof to prevent the risk of overspray.

- All rainwater outlets should be installed, and a leak test of the downpipes should be conducted with the necessary encasement before commencing the roofing system.
- Light mechanical grinding, grit blasting, or high-pressure water jet may be employed to clean the surface to which the foam will be applied, depending on the level of contamination.
- The area/substrate must be thoroughly dry and devoid of moisture, oil, and grease.

4.1.2. Environmental Considerations and Substrate Temperature

- For the best results, polyurethane foam spray should be applied using spraying techniques to substrates when ambient air and surface temperatures is 30ºC or above.
- Any form of moisture, such as excessive humidity (>85% R.H.), rain, fog, or other types of moisture, will chemically react and have a negative impact on the system's performance, thereby resulting in inferior physical properties.
- Wind velocities exceeding 20 km/H may result in excessive loss of exotherm and interfere with the mixing efficiency of the spray gun, affecting foam surface texture, curing, and physical properties. Moreover, it will cause overspray which results in additional material consumption.
- Applications should be avoided in the event of extreme weather conditions such as sandstorms or rain.
- All materials, whether partially used or sealed, must be stored in a covered area, and protected from UV and sunlight. Improper storage and high temperatures may cause deterioration of the products.

4.1.3. Processing Equipment

- The pump/plural component proportioner must be capable of supplying each component within ± 2% of the desired 1:1 mixing ratio by volume.
- Hose heaters should be adjusted to deliver materials at temperatures ranging from 50°C to 55°C to the spray gun. These settings will guarantee thorough mixing in the spray gun mix chamber during typical applications.
- Pressure for Polyol and MDI to be set according to the machine setting and requirement.
- It is the responsibility of the applicator to properly interpret equipment technical literature, particularly information that relates acceptable combinations of gun chamber size, proportioner output, and material pressures.

4.2. Combo Roof Plus Installation

4.2.1. Polyfoam SS 45 Spray Application

1. Polyfoam SS45A + MDI should be applied in four layers, each with a thickness of 15-20mm, for a total thickness of 70mm. The time gap between each layer should range from 15 to 30 minutes, subject to a variation based on the site and weather conditions. Furthermore, applicators must consider the weather conditions and adjust the machine parameters accordingly. Spray application should maintain a recommended distance of 0.80m-1.00m between the spray gun and substrate, although this may vary based on the area of application, requiring the applicator's attention. The excessive foam buildup on parapets is to be avoided, by provide appropriate preventive coverage on parapet walls and equipment foundations before applying the foam.
2. The foam skirting height should be set with a minimum raising of 10mm above the screed level, based on the system's designed height, with a thickness starting from 25mm.
3. The mixing ratio shall be 1:1 (Polyol:ISoCyanate). Each consecutive layer shall be done with the allowable limits by arranging adequate materials on time prior to starting the work.
4. The maximum allowable exposure time of polyurethane foam without protective coating is 3-5 days, according to standard recommendations.
5. If the applied foam is exposed for longer than the standard duration, it is recommended to conduct an inspection of its physical properties to identify the defects or apply an additional layer of polyurethane foam with a minimum thickness of 10mm. Before applying the new layer, perform a minor overspray and then resume normal spraying. Additionally, ensure that the previously applied foam is undamaged and that the surface is clean, free from dirt, sand, dust, and moisture. If moisture is present, wait until the surface is dry before proceeding.
6. For bigger roofs, spray application can be done portion by portion. In the site production, the layers of application can be carried out on consecutive days, with the need to ensure that surface preparations are proper, meaning the sprayed surface should be free from dirt, sand, dust, and moisture. Before starting to spray, a flash layer is to be done and later resume with normal thickness of spraying. It is recommended to have sloped edge so that the application can be continued over it to have proper adhesion.
7. In case any damage has happened during trafficking it is recommended to do a rework

by cutting the edge at a 45-degree angle of the affected area, to ensure the bonding of new application.

4.2.2. Polyflex Combo Waterproofing and UV Protective coating

1. The polyurethane foam is then covered with 1 coat of acrylic modified elastomeric cementitious coating, Polyflex Combo for waterproofing and protection from UV exposure.
2. The required drying time for polyurethane foam, before applying UV protection coating shall be 24 hours.
3. Foam shall be completely covered with coating, without any holes or extra splashed areas on parapets. The coating shall be applied at a coverage rate of 1.4kg/m^2.
4. After applying the UV protection waterproof coating, a minimum of 48-72 hours of curing is required before any other activities can be performed on top of it, the coating needs to be properly dry prior to proceeding with subsequent activities.

4.2.3. Water Impermeability Test

1. A 48-hour water impermeability test needs to be conducted to check for any leakages. It is recommended to fill the test area with potable water to a thickness of 5-7cm and properly plug the rainwater outlets.
2. If the applied waterproof coating has been left exposed for a long duration, it is recommended to conduct an inspection on the coating to assess for any physical damage or other. If anything is detected, applying an additional coat with proper surface preparation (including cleaning or removal of the damaged portion) is advisable.
3. If a leak is detected, the water should be drained, and the root cause needs to be identified and repaired. A counter water leakage test should be conducted again after the rectification to ensure water tightness.

4.2.4. Ridges and Screed Application

1. After completion of the water test, the filled water needs to be removed and the surface should be completely dry before proceeding with subsequent activities The waterproofing layers must be protected from mechanical damage by providing the geotextile separation layer, with an overlap of 20-30cm.
2. Fix the ridges in panels (average panel size: 9m^2) using impregnated bituminous filler board Polyboard & cement sand mortar.
3. A Slope line should be done as per the approved shop drawings.
4. Pour screed concrete into the bays and finish smoothly with power float machines/appropriate tools.
5. Concrete screed shall be cured by potable water or as instructed by the engineer. The screed surface can be covered by wet hessian cloth to maintain curing for 3-7 days.

4.2.5. Angle Fillet and Sealant Application

1. After 7 days' time from the screed works, open the screed expansion joints (15mm x 35mm) panels. Remove the Polyboard topside up to 35mm and fill with backing rod Polyrod and sealant Polyseal PS PG, along with Polyprime PS primer (as per the requirement).
2. Angle fillets (Cement and sand mortar) (100mm x100mm) will be placed at all the skirting termination edges (At the corners of the parapet, roof foundations, openings etc). Apply Rushbond PVA bonding agent as a primer and fix the angle fillet between the vertical and horizontal surface.
3. To ensure the strong bonding for fillets, a fabric reinforcement should be applied on top of the angle fillets by leaving a 5cm extension at both the edges.

4.2.6. Final Coat Application

1. For the topcoat application, the surface shall be clean and loose particles shall be removed. The topcoat shall be applied after completing all the MEP work on the roof or with clearance from the contractor.
2. To avoid the over application, apply 2-inch-wide masking tape along the skirting, just above the fabric reinforcement termination points.
3. Apply 10mm-wide masking tape on the sealant to prevent the sealant lines from being coated.
4. After the above preparations, coating works can be started.
5. Single component, acrylic based Polycryl PF can be applied with a roller at the flat surface and a brush can be used at fillet area.
6. Apply a second coat of Polycryl PF after the curing period of first coat.
7. Ensure the coating is protected during and after their work from third party damages.

5. Legal notice

Apart from the information given here it is also important to observe the relevant guidelines and regulations of various organizations and trade associations as well as the respective standards. The characteristics are based on practical experience and applied testing. Warranted properties and possible uses which go beyond those warranted in this information sheet require manufacturer's written confirmation. All data given was obtained at an ambient and material temperature of +23°C and 50 % relative air humidity at laboratory conditions unless specified otherwise. Please note that under other climatic conditions hardening can be accelerated or delayed.

The information contained herein, particularly recommendations for the handling and use of products, is based on the manufacturer's professional experience. As materials and conditions may vary with each intended application, sufficient tests are to be conducted to check the suitability of products for their intended use. Legal liability cannot be accepted on the basis of the contents of this Method Statement or any verbal advice given, unless there is a case of willful misconduct or gross negligence on the part of the manufacturer.

This document has been prepared to provide general guidance on the Combo Roof Plus System. Individual product technical data sheets are available for more information about any of the system component.

This technical data sheet supersedes all previous editions relevant to this product.