

Project Profile

INTEGRITANK® & PREPRUFE® Plus Waterproofing System Offers World Class Fully Bonded Combined Waterproofing for Doha Metro Red Line South

Project

A new major metro system is under construction in Qatar's capital city, Doha. Once completed, the Doha Metro will consist of four rail lines and 101 stations with a total length of more than 240km. The new metro will become a vital transport link, particularly during the planned 2022 FIFA World Cup Games.

The Red Line runs for 40 kilometres from Al Wakra in the south to Lusail in the north. The line also connects Hamad International Airport at Terminal 1 to the centre of the city. With a total of 18 stations including West Bay, Katara and Qatar University.

Waterproofing protection is a vital aspect of the project. INTEGRITANK® and PREPRUFE® 300R Plus combined waterproofing system from GCP Applied Technologies, offered a world class solution for the Red Line South section of the project.

Challenge

The works to be carried out were the waterproofing of 5 underground stations and 5 switchboxes on the Doha Metro Red Line South. This project required a fast track, durable waterproofing system which would withstand a predicted 120 years design life. Demonstrating a proven track record in local conditions and enduring environmental challenges, namely high water pressure with excavations averaging 25m and high levels of chloride, sulphates and hydrocarbon from the soil, were essential.

Tunnel designers have developed criteria for water tightness known as 'permissible (allowable) leakage', dependent on the level of risk and lifespan of the tunnel. The concept of 'permissible leakage' is difficult to

understand and design to, and in the view of the Doha Metro project, an unacceptable risk. The expectation of 'complete dryness' called for a waterproofing system with a long-standing successful track record in difficult and harsh conditions. In addition, the tight construction schedule necessitated a system with a rapid application speed and cure time.

With these requirements in mind, and having proved their compatibility and effectiveness on previous projects, the INTEGRITANK® liquid membrane and PREPRUFE® 300R Plus pre applied sheet membrane were selected to provide the waterproofing system of choice.

Solution

PREPRUFE® 300R Plus composite HDPE adhesively sealed sheet membrane and INTEGRITANK® cold, spray applied liquid membrane combined to provide world class waterproofing. With a proven track record on similar underground structures, the system demonstrated it met three key requirements: durable enough to last the design life of the structure, fast and simple application to expedite the construction programme, and the necessary protection from the groundwater, sulphates, chloride and hydrocarbons.

PREPRUFE® 300R Plus pre-applied sheets were applied before concreting below the horizontal raft slab. PREPRUFE® CJ tape and Serviseal® 240 waterstop system were used to protect joints. The INTEGRITANK® waterproofing membrane was cold spray applied to form a seamless, fully bonded membrane to protect the basement walls and roof slab.



Design

End-to-end expert project consulting and product selection support



Field

Expert technical support services, job site support, application support and training



Intelligence

Customized tools, strategies and technologies e.g. Verifi® In-transit Concrete Management; Market intelligence reports



Performance

A portfolio of products, services and technologies that provide business solutions to our customers; leading R&D expertise



Sustainability

Extending life cycle of structures and optimizing materials

For more information visit gcpat.com

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Waterproofing Solutions for Cut & Cover Tunnelling

Design for dry

PREPRUFE® Plus
ADVANCED BOND TECHNOLOGY™



INTEGRITANK®
ESSELAC TECHNOLOGY®



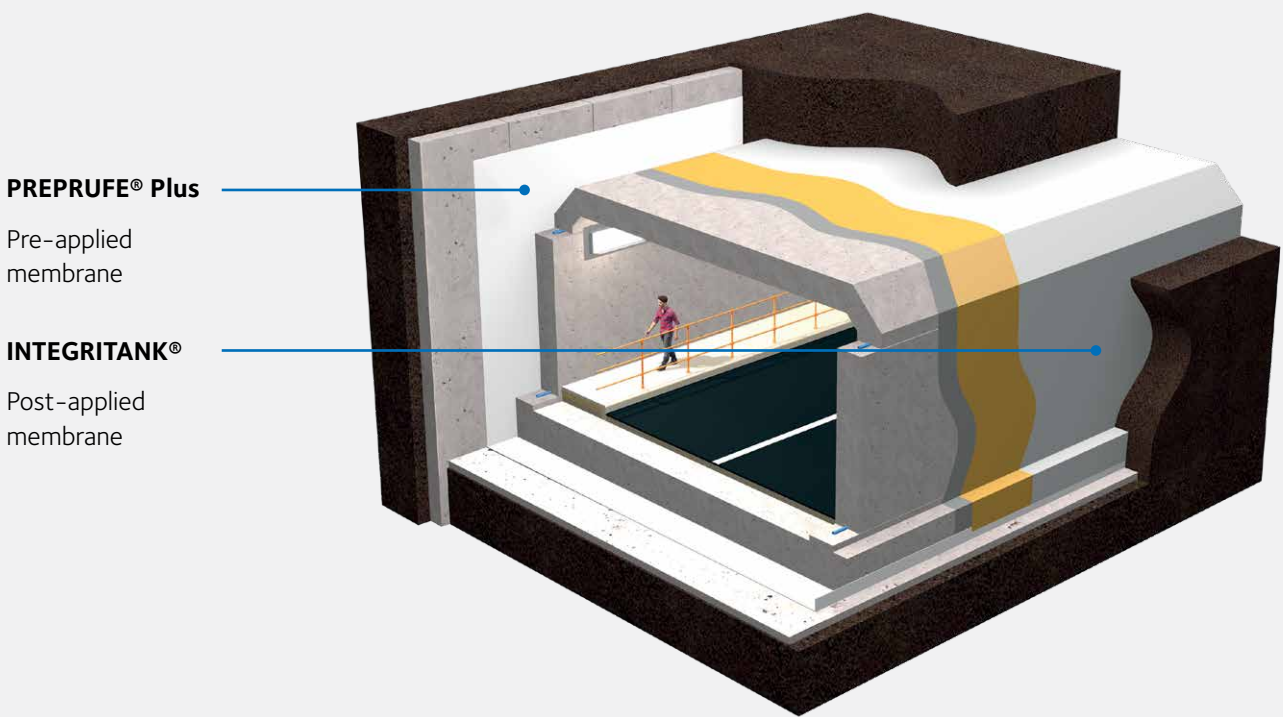
Pre-applied Waterproofing



Fast and Easy Application

- 1 2 trained applicators typically apply 6,500ft² (600m²) a day using lightweight 387ft² (36m²) rolls
- 2 Wet surfaces do not delay application
- 3 No primer is needed
- 4 Self-adhesive ZIPLAP™ watertight laps do not require heat, power or equipment
- 5 Protective surface coating is smooth, non-absorbent, highly resistant to contaminants and dirt, and is easy to clean if necessary
- 6 Membrane is immediately trafficable upon application
- 7 Rebar can be installed the same day, quickly providing a work platform

Full Tanking Solution



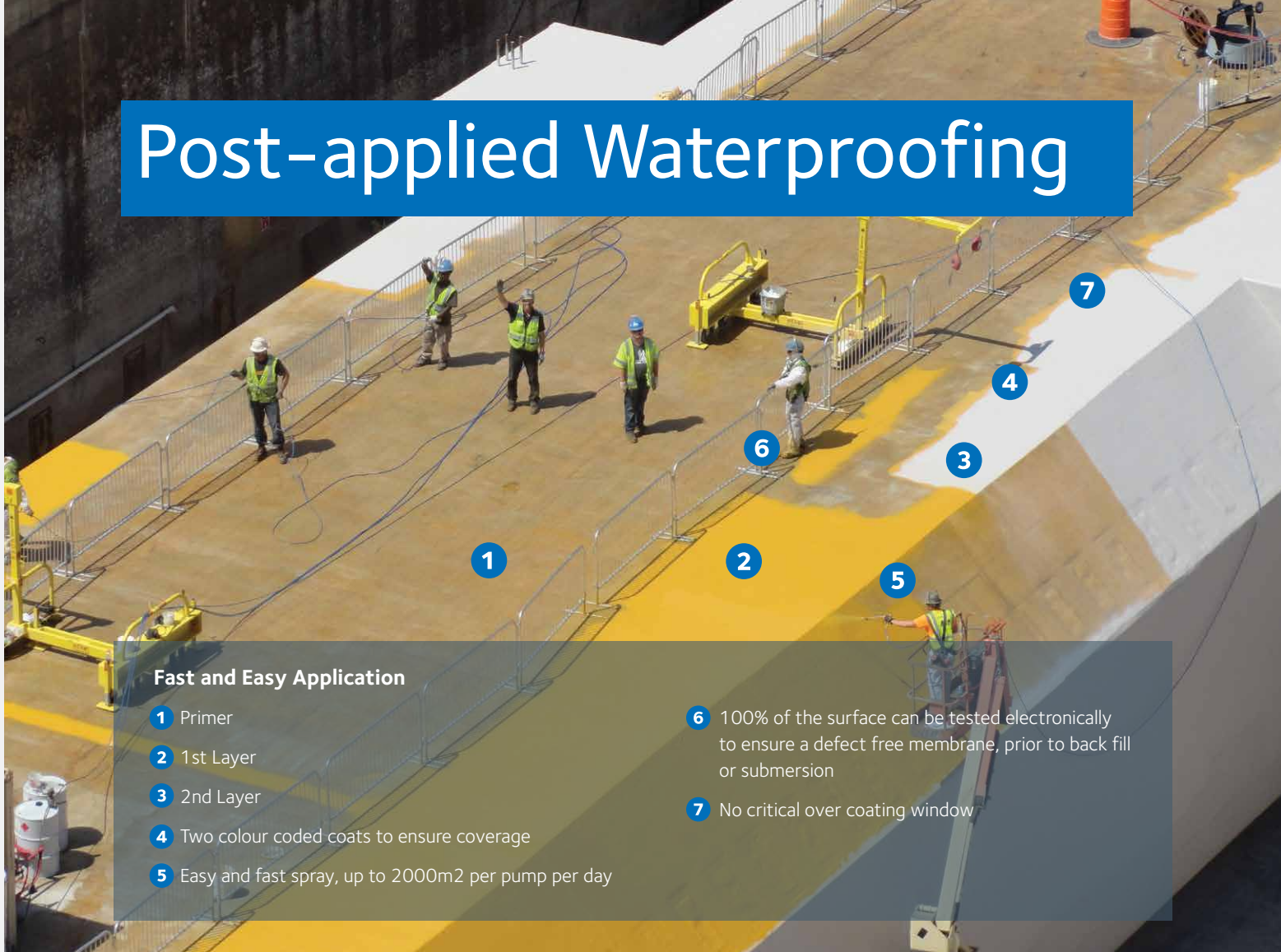
PREPRUFE® Plus

Pre-applied membrane

INTEGRITANK®

Post-applied membrane

Post-applied Waterproofing



Fast and Easy Application

- 1 Primer
- 2 1st Layer
- 3 2nd Layer
- 4 Two colour coded coats to ensure coverage
- 5 Easy and fast spray, up to 2000m2 per pump per day
- 6 100% of the surface can be tested electronically to ensure a defect free membrane, prior to back fill or submersion
- 7 No critical over coating window

PREPRUFE® Plus Waterproofing System with Advanced Bond Technology™



PREPRUFE® Plus is engineered to protect underground structures below ground from water ingress, corrosive soil, gas and moisture.

It easily conforms to complex details to create an impermeable protective seal.

The patented non-absorbent membrane surface coating resists dirt and contaminants and withstands up to eight weeks of UV exposure onsite. The membrane is immediately trafficable without protection layers allowing contractors to install rebar the same day.

PREPRUFE® Plus is fast and easy to install by only two operators. The system is a proven solution for the most challenging site conditions as well as straightforward projects in climates worldwide.

The PREPRUFE® Plus waterproofing system forms a protective barrier for the life of the structure and is recognized as one of the most advanced and unique waterproofing solutions available for below ground structures.

Benefits

- **Bonds directly to the poured concrete**
- **Composed of durable and flexible HDPE geomembrane**
- **High Resistance to Chemicals, Gas and Moisture** – Achieved by the HDPE geomembrane and the integral continuous waterproofing seal
- **Schedule Acceleration** – Immediately trafficable membrane and same day rebar installation
- **Limited Damage, Dirt and Contamination** – Patented non-absorbent and smooth surface coating allowing up to 8 weeks (6 weeks for hot climate) of UV exposure

Full Integrated Solution - Achieve Dry Usable Underground Spaces with PREPRUFE® Plus and INTEGRITANK®

Benefits

Fast Track	Simple, fast installation of both pre-applied and post-applied
Cold-Applied	No hot works
Environmentally Friendly	No VOCs, solvents or PVC plasticiser leaching
Track Record	Global track record on major projects
Fully Bonded	Zero water tracking, unaffected by ground settlement
Tough, No Protection Needed	Eliminates cost and time to install boards or screeds
Durable, Chemical Resistant	Protection for the life of the structure, BBA Certified for the life of the structure
>70m Lateral Water Migration Resistance	Waterproofing excellence
BBA Certified	Third party certification
Trained Applicators	For quality installations
GCP Expertise	Unrivalled technical support from design to site service

INTEGRITANK® Fully Bonded, Seamless, Tough & Durable Spray-applied Waterproofing System



INTEGRITANK® is a fully reactive elastomeric, cold spray-applied waterproofing system designed to outlast the design life of the tunnel.

INTEGRITANK® provides a tough, durable, fully bonded membrane, resistant to backfill, hydrostatic pressure and long term immersion in water. INTEGRITANK® can be combined with PREPRUFE® Plus to deliver the complete solution for cut and cover tunnelling.

With a successful track record of protecting both Immersed Tube and Cut & Cover Tunnels around the world, INTEGRITANK® has set new standards in tunnel waterproofing performance. Prior to submersion or backfill INTEGRITANK® can be electrically tested post application.

Benefits

- **Schedule Flexibility** – Rapid and reliable coverage; fast curing
- **Seamless, Liquid Spray-applied** – No weak and vulnerable joints, more effective waterproofing especially at details, corners, penetrations
- **Excellent Crack Bridging Capabilities**
- **Quality Assurance** – 100% of the surface tested electronically to ensure no defects; two separate colour-coded coats