

Introduction

Developed and manufactured by QED Chemicals since 1985 in the UK, Margel™ is a Vapour Phase Inhibitor made up of a blend of three advanced corrosion inhibitors with proven results across multiple industries. The combination of these products work in unison as an Ambiodic solution, i.e. working on both anode and cathode through electrolytic protective action.

Margel works as a migrating corrosion inhibitor by building a vapour density within an enclosed space. It quickly vaporises and is adsorbed to the steel surfaces within close proximity, blocking the path of Chlorides, Water and Oxygen - the fuels of steel corrosion. The components in Margel provide sufficient vapour, where 60grams will provide effective protection to 1 metre³ of air space. Once the Margel™ is adsorbed onto steel surfaces, it creates a chemical bond that provides a durable and highly protective coating to both new and highly corroded steel. It is important to note that does not reverse corrosion; but it will stop further corrosion.

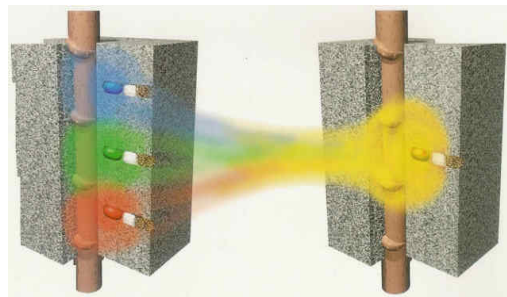


Figure 1

Figure 1 above illustrates the three chemical elements that provide a unique three-pronged approach to tackle the problem of corrosion. The Margel releases a vapour that saturates a given airspace. This vapour forms a mono-molecular coating on exposed and embedded steel. The product travels easily through even dense materials such as concrete, to coat steel with an anti-corrosive coating.

➤ **Margel Fast Action Component**

Margel's fast action quickly vaporises and permeates the concrete substrate. Its alkalinity ensures early passivation of corrosion as it is adsorbed to the reinforcing steel surface, blocking the path of Chlorides, Water and Oxygen, the fuel of reinforcement corrosion.

➤ **Margel Medium term Component**

Slower to vaporise Margel medium term supplements and replenishes the protection afforded from the initial fast action component. This forms a greater bond strength barrier to extend the period of protection.

➤ **Margel Long term Component**

A complex ethanolamine derivative that provides long term protection. The very slow release of this component (over a period in excess of twelve months) gives the extended adsorbed protective care to steel reinforced concrete structures.

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MARGEL VPI 1020 – ANTI-CORROSION PATCH SYSTEM

QED’s anti-corrosion patches are pre-impregnated with QED’s Margel™ corrosion inhibitor. Patches are applied directly to steel pipes and pipelines to provide total protection from corrosion for a period of up to 15 years. The patches are over-wrapped with insulation (where appropriate) and a final layer of VentureClad™/tape¹ (Figure 2).



Figure 2

The patches are suitable for application on exposed steel pipes of all sizes being equally effective on both new and heavily corroded steel. In comparison to other anti-corrosion treatments the steel surface of the pipe to be protected requires no preparation; the only requirement is the patch is placed on the steel surface to be protected.

The Margel™ corrosion inhibitor is proven in practice and provides a highly effective corrosion resistance layer on steel by coating with a mono-molecular chemical layer which inhibits corrosion. The outer cores of the tape will seal the vapour given off by the Margel™ corrosion inhibitor, containing it within the tape ensuring that it protects the steel of the pipe. The patch and tape system are engineered to withstand continuous temperatures of up to 149°C.

VentureClad™ and Venture Tapes are coated with a special acrylic pressure sensitive adhesive system which combines superior quick stick at normal temperatures and also at extreme low temperatures. The serviceable life of the tape is expected to be in excess of 15 years. The special laminated construction of the tape makes it highly puncture and tear resistant as well as flame retardant. The tapes have been successfully used in the petrochemical and cryogenic industries as a vapour barrier closure system. With the Margel™ migrating corrosion inhibitor the combined product is extremely effective in combating **Corrosion Under Insulation (CUI)**.

¹ VentureClad™ and Venture tape range from Venture Tape Corp. (a 3M Company)



MARGEL™ VPI 1020

TECHNICAL DATA

Patches are supplied in boxes of 100; each patch contains sufficient Margel™ corrosion inhibitor to protect 0.5 square metres of surface area of a pipe. Therefore each box treats 50 square meters of surface area.

It is important for the effectiveness of the Margel™ vapour corrosion inhibitor that the patches are overwrapped with a high quality vapour barrier (VentureClad™).

QTY Example; on a 300mm diameter pipe, patches would be placed every 0.5 metres along the length to achieve the required coverage. Therefore for every 50 metres of 300mm pipe, 100 patches would be required.

Application Chart

Pipe Diameter	Patch per mm	Patches/100m	Patch/metre
76mm	2127	47	0.47
89mm	1818	55	0.55
114mm	1410	71	0.71
169mm	952	105	1.05
205mm	781	128	1.28
253mm	625	160	1.60
305mm	500	200	2.00
406mm	392	255	2.55
610mm	263	380	3.80

NB. It is not recommended to have patches spaced more than 1 metre apart, therefore on small diameter pipes (less than 168mm), it is advisable to use half patches with increases frequency. For couplings, flanges, valves, tanks, etc., use the calculation of 1 patch/m².

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**DCI 580T (VPI 580) TEST
BY BIERRUM STRUCTURAL SERVICES LTD**

In 1990, Bierrum Structural Services Ltd & QED jointly commissioned a test to show the effect of Margel DCI 580T on suppressing steel corrosion within concrete. Testing was carried out by Bierrum at their Peterborough site.

Ten concrete cubes were prepared in a mould measuring 400mm x 400mm x 400mm, single steel reinforcing bar measuring 500mm in length was set in the centre of each cube. Chloride levels were calculated at 2% by volume of concrete. 5 of the cubes were drilled with a hole to a depth of 100mm in the middle of one side. A Margel cartridge 25mm long by 25mm diameter was sealed in the cavity drilled within the concrete. The cubes were left stored outside for a period of approximately 3 years.

In September 1993, the concrete cubes were broken to assess the effects of the Margel DCI 580T. In the cubes with the Margel cartridge installed, there were no signs of corrosion to the rebar. In the cubes without the protection of Margel, the corrosion of the steel rebar was significant as shown in the photographs below.

Microscopic (x50) Photographs of Steel Reinforcement in Concrete

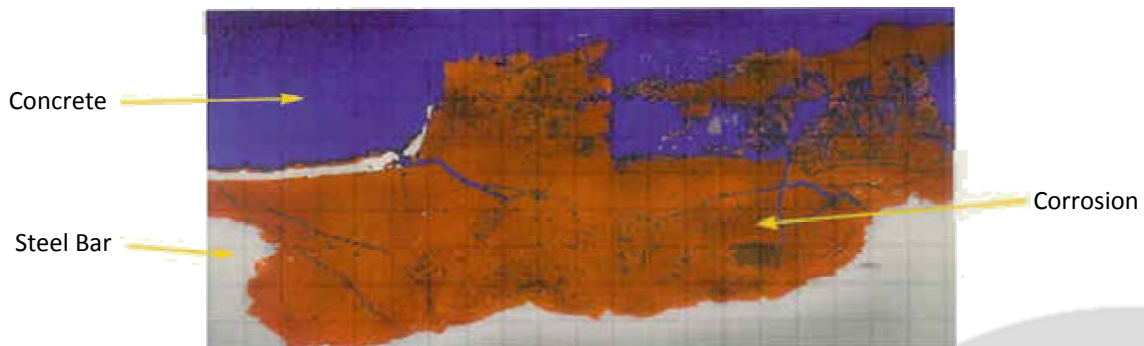


Figure 3

Figure 3 illustrates a cross section showing the expansion of corrosion on a steel reinforcement bar in concrete with 2% chloride

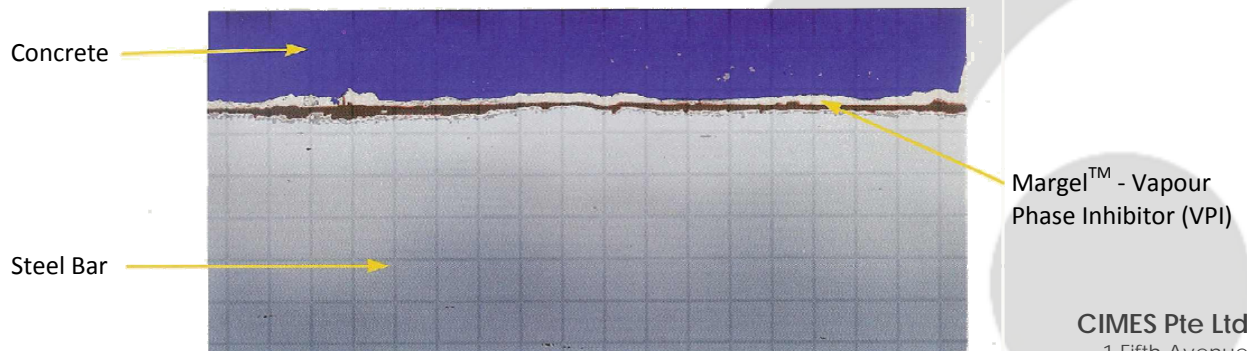


Figure 4

Figure 4 illustrates a cross section showing the effect of Margel VPI580 on suppressing steel corrosion by adsorption to the surface.

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