WINN & COALES INTERNATIONAL LTD

Denso Digest

Denso®

LEADERS IN CORROSION PREVENTION
& SEALING TECHNOLOGY

QUALITY & INNOVATION FROM 1883 INTO THE 21st CENTURY

WINN & COALES INTERNATIONAL LTD

Welcome to another collection of recent application stories featuring Denso products. For further information please contact your local Denso company listed below or fax/mail the form on the back page of this brochure.

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Corrosion Prevention - Buried Pipelines

New Pipeline gets Denso Protection

To enable quick identification of the subject matter within each story in this brochure we have adopted the following colour codes.

PROJECTS INVOLVING:

PROTECTIVE COATINGS FOR.....
- BURIED PIPELINES & LPG VESSELS
- EXPOSED STEEL & PIPEWORK
- SUB SEA PIPELINES & JETTY PILES

PROTECTIVE LININGS FOR.....
- STORAGE TANKS, PUMPS ETC

SEALING & WATERPROOFING.....
- SEALING MASTICS
- MEMBRANES & FLASHINGS
- INDUSTRIAL TAPES

Petronet, South Africa's largest fuel pipeline operator, specified the Denso Ultraflex/MDP Tape Wrapping System for the corrosion prevention of a new 33km 324mm OD pipeline.

The route covers some treacherous terrain requiring the pipe to be strung out, welded and snaked into the trench.

The wrapping takes place after the butt welds have ben x-rayed. The surface is prepared to a St2 standard with mechanical cup brushes. The pipe is then primed with the fast drying Denso Primer D prior to the inner Ultraflex and outer MDP tapes being applied by a Denso Wrapping Machine.

The spec calls for a 55% overlap or double wrap of both innerwrap and outerwrap. As a result of this, a total of 74,000m^2 of tape has been ordered.

MDP Rockshield outerwraps are manufactured on Denso South Africa's new Industrial Tape Plant to the ISO 9002 manufacturing standard.

The work is being carried out by Protekon Construction with the contract period being one year.

Above: The Denso system is applied prior to the pipe being 'snaked' into the trench.

Below: 12m lengths of pipe stockpiled ready for welding into position.

Denso Protal 7125

Denso Protal 7125 has been specially developed as a two-part liquid pipeline coating to be applied in colder climate conditions. Since the introduction of Protal 7125 over three years ago, it has become the pipeline coating of choice in colder weather conditions and on colder in-service operating pipelines.

Cold climate conditions can greatly influence the methods used in new pipe construction and in the maintenance of existing pipelines. In particular, cold climate conditions can affect the storage, handling, application and backfill readiness of many field applied coating systems. As well, the long-term corrosion protection performance of some types of coatings can be negatively affected by cold climate conditions.

The maintenance or replacement of coatings on existing in-service, operating pipelines in cold climate conditions can pose quite a challenge. In this case, the substrate temperatures can not effectively be altered to aid in coating cure times, as the products flowing in the pipe tend to act as a huge heat sink. Coating products have to be handled and applied with these temperature influences being taken into consideration. Often this requires the coatings to be kept warm during the storage, handling and application processes and may also require the work area to be temporarily covered over and heated during these activities.

Various other pipeline conditions exist that can affect coating performance in cold climate conditions:

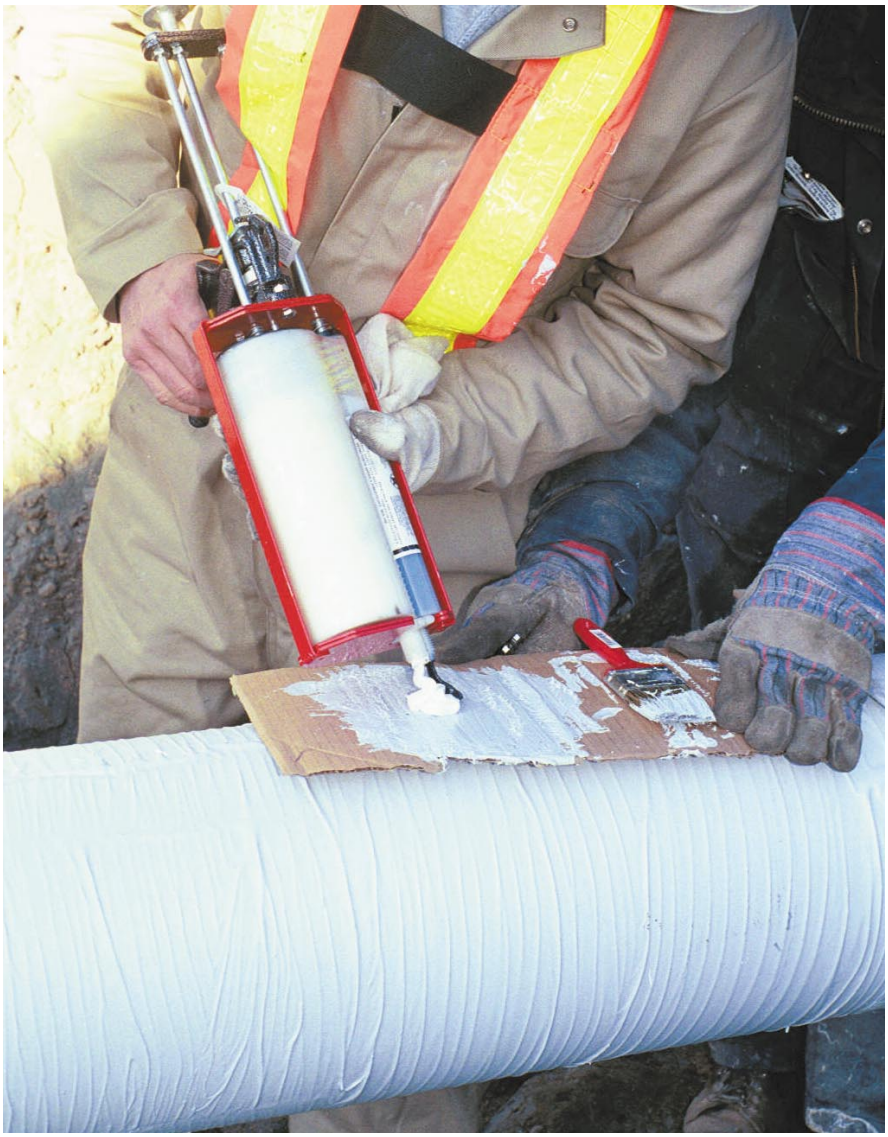
- *Environment of exposure e.g. chemicals, solvents.*
- *Availability of surface preparation equipment and heating equipment.*
- *Ambient conditions at time of coating application.*
- *Condition and compatibility of any existing coatings.*
- *Terrain and backfill material (rocky, sandy, clay, etc.).*
- *Skills of the work crew available.*
- *Intended life expectancy of pipeline.*
- *Site conditions, such as degree of surface cleanliness and dust contamination, product shelf life, product pot life and cure temperature range (if applicable).*
- *Significant pipe movements due to temperature fluctuations and heavy soil stress conditions (dry-wet clay).*

Protal 7125 applied to a 273.1mm (10") operating products pipeline at 5°C (41°F) that was cured and ready to be backfilled in 65 minutes.

Field applied coatings on new pipeline construction are the least affected by cold ambient conditions. In this case, the substrate temperature can be quickly raised to meet the application requirements by applying external heat, a technique not possible on an operating pipeline.

The true challenge in cold climate conditions is in the maintenance and repair or replacement of coatings on existing in-service, operating pipelines. This is where Protal 7125 excels. The ease of application, fast cure and quick backfill times make Protal 7125 well liked by field crews applying the product.

Corrosion Prevention - Buried Pipelines



Above: Pipe coated with Protal 7125 that has been applied by roller. Protal 7125 Repair Cartridge being dispensed prior to mixing for brush application.
Below: Protal 7125 is applied by brush at pipe support areas that were left during roller application.

Protal 7125 has been extensively tested in numerous coating testing laboratories with excellent results.

Protal 7125 Features:

- *Cold temperature application and cure (down to -20°C {-4°F}).*
- *Will not freeze.*
- *Fast cure and initial set.*
- *High build (in one coat).*
- *Brush, Roller or Spray application.*
- *Packaged in 1.0 litre kits and repair cartridge packs.*
- *Excellent adhesion to steel and FBE.*
- *High abrasion resistance.*
- *Does not shield cathodic protection.*
- *Winter grade or summer grade available.*
- *High resistance to moisture during cure.*

The combinations of easy application with good laboratory test performance have made Protal 7125 the cold climate coating of choice in Canada.

Corrosion Prevention - Exposed Offshore Cranes

Denso Protection for Offshore Cranes

Kenz Crane B.V. at Zaandam in the Netherlands produces lifting equipment for the offshore industry and is one of the five largest companies in this field, in the world.

These cranes, used on drilling rigs and supply boats, are hydraulically driven and have to endure severe maritime environments with temperatures sometimes exceeding 50°C. Consequently, attention must be paid to corrosion which can occur rapidly in these conditions.

For maintenance purposes the hydraulic mains need to be disconnected frequently/easily and the couplings are particularly vulnerable to corrosion.

After due consideration, Densyl Tape was chosen for its superior performance in high temperatures against moisture and salt.

The Multi Purpose Support Vessel 'Toisa Polaris' with its crane (capacity of 250 tons at a radius of 13m reaching to a depth of 1200m) has since been protected by Densyl Tape in this manner.

The detail of the application can be seen quite clearly in the photograph depicting a similar application to a crane on the Mobil Mallory Gasplatform in the North Sea.

This application of Densyl Tape has worked perfectly showing once again, yet another application for a proven, reliable product.

Above: Densyl Tape applied to a crane's hydraulic connectors on the Mobil Mallory Gasplatform.

Above: Concrete is pumped into the annulus space between the jacket and timber pile.

Pile Rehabilitation in the Big Apple

Pier 16 in Manhattan, NY is one the city's most active tourist pier. It is adjacent to the Fulton Fish Market. In service for over 50 years, the timber piles have received marine borer damage, which threatened the structural integrity of the pier. This major rehabilitation called for more than 6,000 LF of timber pile repairs.

The pile repair system chosen was a concrete encapsulation with fiberglass forms. The consultant, Han-Padron and New York City Economic Development Corporation approved Denso's SeaShield Fiber-Forms.

The SeaShield Fiber-Forms (fiberglass jackets) are a custom fabricated fiberglass jacket with a tongue-and-groove closure. It provides a strong rigid form to allow concrete to be pumped into the annulus space between the jacket and timber pile.

The timber piles that had received extensive damage from the marine borers received concrete encapsulation. The repair involved building a reinforcement cage around the piles and then installing the SeaShield Fiber-Form. The concrete was then pumped into the annulus space, which increased the overall strength of the pile. To provide ease of application the forms were fabricated in a translucent color to allow the contractor to view the concrete level during the pumping operation.

The contractor, Bob Buecker of Strongwork Diving stated "The SeaShield Fiber-Forms were of high quality, provided on-time delivery and easy to install due to the jackets being translucent". The engineers and owners were pleased with the installation as the application was completed ahead of schedule.

Above: The SeaShield Fiber Forms are positioned around the timber piles.
Below: Completed SeaShield Fiber-Form system.

Corrosion Prevention - Exposed Steel Pipebridges

Denso Long-term Protection Without the Need for Abrasive Blasting

Severn Trent Water has carried out a renovation programme on seven pipebridges carrying treated water in Warwickshire. To give long-term protection and minimise costly future refurbishment, the contractors, D & D Industrial Coatings Ltd of Warrington, Cheshire, have selected a Denso Steelcoat tape wrap system for the exposed pipeline and a Denso Steelcoat Epoxy Mastic liquid coating for protecteing adjacent steelwork forming the pipebridge.

Renovation of the final pipebridge, Berkswell south of Coventry, which carries two 24in water pipelines over the main London to Birmingham railway line is now fully completed.

Surface cleaning preparations were carried out by hand power tool methods. Denso Steelcoat 400/100 tape wrap system provides a controlled coating thickness and was easily and very quickly applied to all main pipe sections and flanges

A final Denso Urethane Topcoat was selected in preference to Denso Acrylic Topcoat due to low temperature conditions during the coating application. Denso Steelcoat 700 brush applied system for the steelwork comprised two coats of Denso S.T. Epoxy Mastic followed by Denso Weathershield Urethane.

The completed Denso Steelcoat Systems on the Ragley Hall pipebridge.

Corrosion Prevention - Buried Pipelines

Denso Protection at London's New Exhibition Centre

Around 1km of 600mm diameter ductile iron and steel pipework and fittings supplying water for the Excell Exhibition Centre in London's Royal Victoria Docks area has been protected with a Denso Tape System.

Subcontractors DOCWRA applied Denso Primer followed by Densoclad 70 Tape. For couplings and fittings, Denso Profiling Mastic was used to smooth the profile of the joints before applying the Densoclad 70 Tape.

Densoclad Tapes consist of a thick polymer bitumen adhesive laminated to a tough plasticised pvc backing. These cold applied tapes are designed for protecting buried or immersed pipes and fittings.

The Excel Exhibition Centre is designed to replace Earls Court and Olympia as London's major exhibition venue, with the advantage of easier access by road, the Docklands Light Railway and the adjacent City Airport. It was built by main contractor Sir Robert McAlpine for English Heritage. The site includes a Grade II listed Victorian warehouse.

Denso Profiling Mastic was used to smooth the profile of the couplings prior to wrapping with Densoclad 70 Tape

Linings - Water Storage Tanks

Archco-Rigidon Lining Protects 'Earthquake' Water Tank

As part of a periodic safety review by British Energy it was decided to build a new seismically qualified standby water storage tank at their Teesside-Hartlepool Power Station. With a capacity of more than 1600m³, its purpose is to help cool the reactor in the unlikely event of an earthquake in the area.

An earlier water storage tank had been coated with a coal tar based paint but after six years British Energy maintenance engineers found it "less than desirable". Following research on a number of available linings, they chose Archco-Rigidon 423D. Formulated from a glass flake filled vinyl ester resin, it has been specially developed to give long life protection in corrosive environments.

The main contractors for the design of the new storage tank and the cooling system were Thermal Engineering International. Sub-contractors McDonalds Engineering built the Tank and applied the Archco-Rigidon 423D lining.

Internal view of the water tank lined with Archco-Rigidon 423D.

Corrosion Prevention - Buried Pipelines

The Pipelengths being wrapped with Densoclad 70 Tape.

Denso Ultraflex 1500 - Not just a girth weld coating!

Recently in the city of Newcastle (located 150km north of Sydney in New South Wales), the Craig Mostyn Group completed a new facility at Kooragang Island's bulk liquid berth.

The facility is designed to store and process oils ready for export. A final part of the project is to construct and install 1.6 kilometres of 153mm Ø pipe from the plant at Kargoil for the transportation of Linseed Oil to the facility at the bulk liquid berth.

Selecting a coating for the oil line was subject to numerous conditions including the ability to withstand temperatures of up to 65°C and proven performance in aggressive soil conditions. In addition long term, cost effective corrosion prevention was required as well as ease of application on site.

Denso Ultraflex 1500 was selected not only for the girth welds, but also as the full linepipe coating. The contractor has applied the tape using a hand-wrapping machine on site, to ensure the correct overlaps and tension.

The finished Denso Ultraflex 1500 Tape application demonstrating its excellent linepipe wrapping properties.