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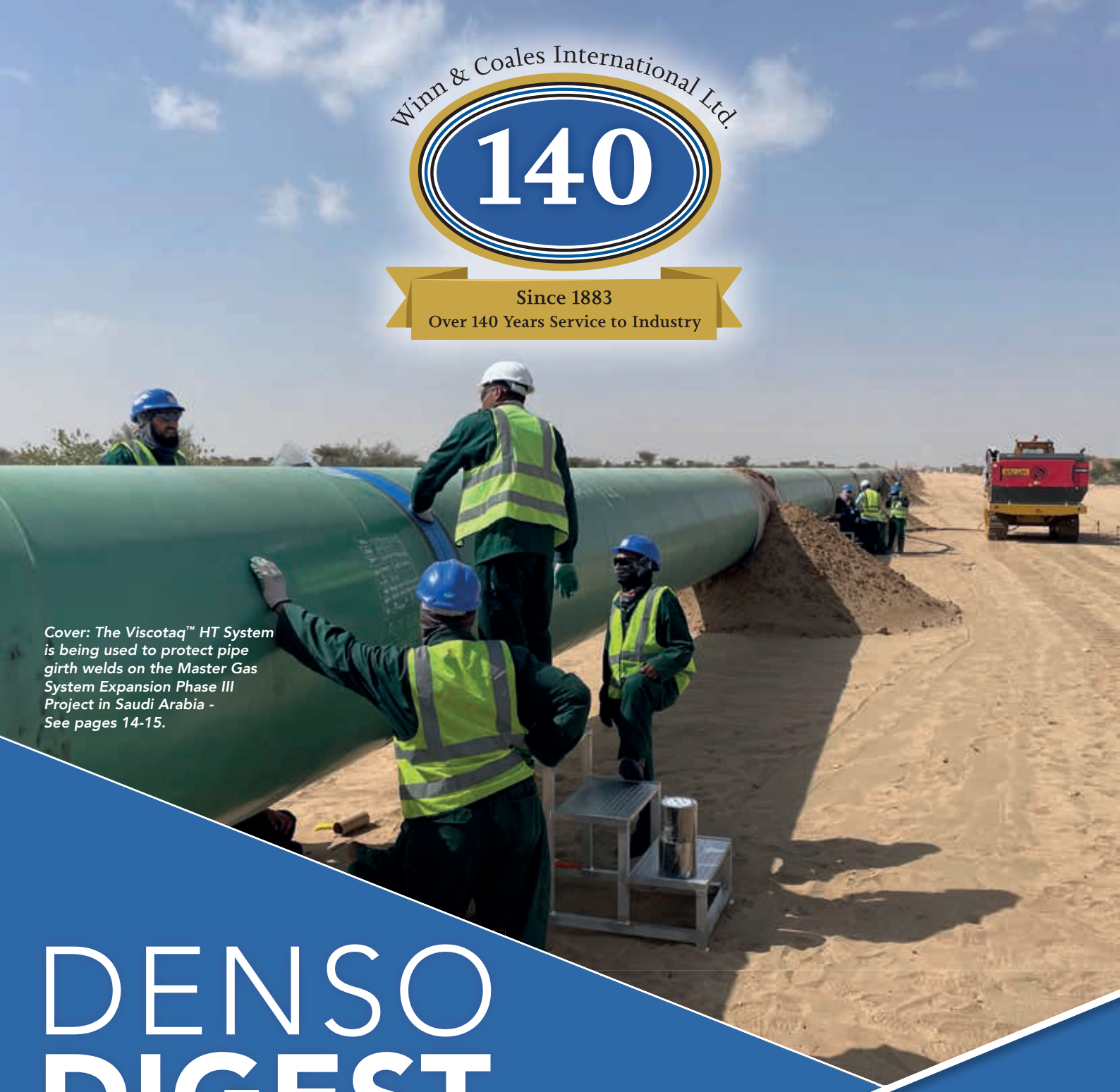

Cover: The Viscotaq™ HT System is being used to protect pipe girth welds on the Master Gas System Expansion Phase III Project in Saudi Arabia - See pages 14-15.

DENSO DIGEST

Winn & Coales International Ltd

Volume 38, Number 2

Denso®

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SeaShield™ Protects Jetty Piles at New Deep Water Terminal in Stornoway

A £49 million project to create a Deep Water Terminal at Stornoway on the island of Lewis was carried out by McLaughlin & Harvey. The aim of the project was to create a multi-functional facility capable of berthing Cruise Ships and to accommodate large vessels servicing future renewable energy developments

PROJECT SUMMARY

Product Type:
Sub Sea Splash Zone Coating

Country:	Isle of Lewis, Scotland
Object:	Steel Jetty piles
Problem:	Corrosion prevention
Product Solution:	SeaShield 2000FD™ System

The facility has two berths with the main berth suitable for vessels up to 360 metres long and at low tides still has a water depth of 10 metres.On the Berthing Dolphin, Wallace Stone, Consulting Civil Engineers recommended the use of Winn and Coales (Denso) Ltd's Seashield 2000FD™ System to protect the piles in the splash zone.

Consisting of Denso Paste S105™, Denso™ Marine Piling Tape and Seashield 2000FD™ Jackets the system provides proven long-term protection against corrosion. The HDPE jackets are installed using tensioning equipment and stainless steel bolts ensuring the jackets fit tightly around the pile.

The installation of the Seashield 2000FD System was carried out by Ocean Kinetics with support from Winn and Coales (Denso) Ltd.

Tensioning the stainless steel bolts that clamp the Seashield™ 2000FD jackets to the jetty pile.

The complete Seashield 2000FD System protecting one of the piles.

Replaced Burst Pipe Protected with the Denso™ Petrolatum Tape System

George Leslie Ltd recently completed replacing a burst pipe for Scottish Water in Strathclyde Park. The complex contract involved an extensive clean-up operation, over pumping sewage flows, decommissioning the old pipe and installing a new steel bridge to support a new 700mm dia pipe.

PROJECT SUMMARY

Product Type:
Coatings for Exposed Steel

Country:	Scotland
Object:	Exposed steel water pipeline
Problem:	Pipe supports/touchpoints corrosion
Product Solution:	Denso™ Petrolatum Tape System

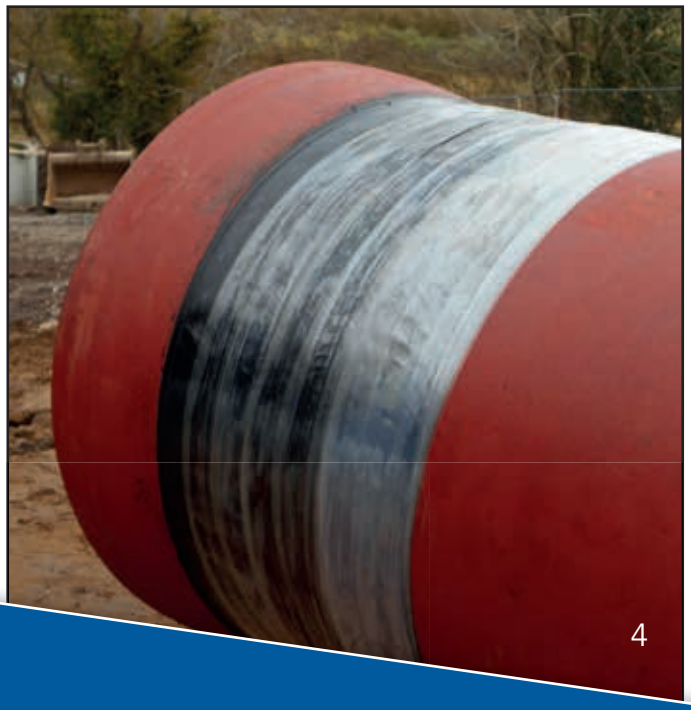
The new pipe was supported on steel brackets and additional abrasive and corrosion protection was provided at these areas by applying a system supplied by Winn and Coales (Denso Ltd).

Pipe supports or touchpoints are one of the most critical areas of piping systems that must be protected from corrosion and mechanical damage. It generally occurs anywhere the pipe rests on a support or comes in contact with another structure. These hard to reach areas can, without notice, often result in pitting and crevice corrosion causing unexpected leaks.

Below: Pipe supports/touchpoints fixed into position, directly over the Denso™ Petrolatum Tape System wrapped sections of pipe.

Sealing off this area from the environment and a good inspection program is critical to the long-term service life of the pipe. The solution proposed by Denso was to use the Denso™ Petrolatum Tape System comprised of Denso™ Tape, Denso™ SA PVC Outerwrap and Denso™ Glass Outerwrap UV. This complete system addresses and eliminates the corrosion and abrasion issues that can often cause damage to pipe support areas. The system was easily installed by hand without special equipment.

Below: The Denso Petrolatum Tape System is applied to the pipe directly underneath where the pipe supports make contact.



Viscotaq™ Protection for Pipes at Sydney Airport

Did you know that VISCOTAQ™ is an ideal solution for protecting buried stainless steel? While stainless steel is naturally resistant to rust, its smooth, low-porosity surface still presents challenges for coatings.

50 stainless steel spools were wrapped with the Viscotaq system.

VISCOTAQ's viscoelastic composition ensures it bonds securely to stainless steel surfaces, creating a seamless barrier that prevents air gaps or vulnerabilities (even on irregular shapes or complex geometries).

This was demonstrated during a May 2023 project at the new Sydney Airport, where VISCOTAQ™ ViscoWrap HT (thermal resistance from -45°C to 95°C) and VISCOTAQ™ PVC Outerwrap were selected as a two-layer coating system to provide long-term protection for a buried stainless steel fuel piping network.

The project wrapped nearly 50 stainless steel spools, each with a 2-3" diameter, designed as part of a more extensive fuel piping system. These spools were wrapped off-site before being transported to the project location, where the final welding and protection of the field joints was completed.

Key to the project's success was the specialised training provided by our National VISCOTAQ™ Manager, Adam Matthews. This training ensured the applicators were well-versed in proper surface preparation and the correct application method which contributed to an excellent outcome.

PROJECT SUMMARY

Product Type:
Coatings for Buried Steel

Country:	Australia
Object:	Stainless steel fuel pipeline
Problem:	Corrosion prevention
Product Solution:	Viscotaq™ System

VISCOTAQ™

Denso™ & Viscotaq™ Protects Tank Farm Pipelines

As an industry leader in corrosion prevention, Denso Australia provided several made-to-measure systems that will extend the lifespan of a Queensland tank farm's pipelines and maintain their structural integrity.

Application of the Denso™ Petrolatum Tape System to the jet fuel pipeline.

Jet Fuel Pipeline:

Stainless steel is highly resistant to corrosion, but when used in an ethanol pipeline carrying jet fuel, additional protection is required to prevent pitting and external environmental degradation. The combination of Denso™ MP Primer, Densyl™ Tape, and Denso™ PVC Outerwrap products were selected to form a robust protective barrier, ensuring the long-term integrity of this critical fuel transport line.

PROJECT SUMMARY

Product Type:
Coatings for Buried Steel

Country:	Australia
Object:	Fuel and firewater pipelines
Problem:	Corrosion prevention
Product Solution:	Denso™ & Viscotaq™ Systems

Firewater Pipeline:

The firewater pipeline is a mission-critical safety asset that must be maintained in optimal condition. The parent coating, FusionKote, required a field joint system compatible with its characteristics, ensuring full continuity of corrosion protection. The use of VISCOTAQ™ ViscoWrap ST was ideal due to its ability to adhere to Polyethylene coatings, conform tightly to irregular surfaces and provide a corrosion barrier.

Diesel Pipeline:

The diesel pipeline, coated with a 2-layer Fusion Bonded Epoxy (FBE) system, required a field joint solution that would bond effectively to the parent coating while providing superior corrosion resistance at the welds. The VISCOTAQ™ system was chosen due to its surface tolerance and adhesion, whilst the additional mechanical layers provided long-term stability and protection.

Below: View of buried pipelines post-application.

Above: Application of the Viscotaq™ System.

Above: Application of Denso™ Glass Outerwrap.

Above: Alternate view of the pipelines, post-application.

For the firewater and diesel pipelines, the VISCOTAQ™ Field Joint Coating System was selected based on the following criteria:

- Its full compliance with AS 4822:2024 (External field joint coatings for steel pipelines).
- The system's ability to conform seamlessly to irregular surfaces as well as its superior adhesion.

By implementing a combination of Denso™ and VISCOTAQ™ solutions, this project successfully mitigated corrosion risks on critical port infrastructure. The selected systems were chosen based on compatibility with the parent coatings, pipeline function, and site conditions, ensuring seamless integration and maximum service life extension.

Denso Australia's expertise in corrosion prevention ensures that the tank farm's assets will remain protected for years to come, reducing maintenance costs and safeguarding essential fuel and firewater pipelines in this vital port facility.

Below: Finished applications for the VISCOTAQ™ Field Joint Coating (top and second bottom pipes with Glass Outerwrap) and Denso™ systems (bottom pipeline with PVC Outerwrap in view).

Selkirk Trestle - Timber Support Piles Protected with SeaShield™ System

Located right in the heart of Victoria, crossing the Selkirk Waterway is the Selkirk Trestle built by the Canadian National Railway starting in winter of 1916 and completed in 1919. It was used to haul logs from sawmills and other supplies to the Borden Mercantile. The last train went over January 5th, 1990. It is well over 100 years old.

The popular Selkirk Trestle.

PROJECT SUMMARY

Product Type:
Sub Sea Splash Zone Coating

Country:	Canada
Object:	Timber pile
Problem:	Increasing structural integrity
Product Solution:	SeaShield™ Series 400 System

In the 1980's the Galloping Goose Trail was formed, and the Trestle is a major feature allowing people to cross the bay to get home or to work. It hosts 3.8 Million visits a year which comprises 80% cyclists and 20% pedestrian use, the trends are showing that this will increase due to modern lifestyle changes and a focus on health and fitness.

The Trestle was determined to be near the end of its serviceable life after aging and a fire 25 years ago had affected the structural integrity of the piles supporting the Trestle bridge. Upgrades have been completed to the deck, railing and bridge to allow sailing and taller vessel to pass through the waterways below into "The Gorge". With this all being said, the Trestle still needed the structure to be sound. The Capital Regional District used Stantec to evaluate and test the piles supporting the trestle and determined that about 60 of them need to be structurally repaired.

Salish Sea was chosen for the repair work to the Trestle and their product of choice would be the Denso SeaShield™ Series 400 system. Engineering group Stantec had initially chosen a legacy different product, but through meetings and consultation, we had the SeaShield Series 400 specified to be used instead. One area of concern was the strength of the reinforcing, so we developed a way to double wrap our C-Grid Carbon Fibre instead of the usual single wrap.

The Grid was then reinforced even more by adding 5/8" fibreglass rebar vertically. In the end Stantec was satisfied it would meet their requirements.

The SeaShield Jackets in place ready for the cavity fill of SeaShield 510 grout.

Salish started the cleaning of the piles marked for repair and then working with divers in the water, started the process of spacing the C-Grid properly with the Fibrglass reinforcing rods. Then the correct spacing between the C-Grid, rods and Series 400 Jackets was worked out. Stiff tubes of pvc were adapted with camlocks and used to get the grout evenly distributed via tremme method right on the seabed to pour a plug.

The completed SeaShield Series 400 System installed on the repaired piles.

Once the plugs cured, the rest of the jackets were grouted at low tide to ensure a complete cavity fill of grout. In cases where an extra jacket was needed for height, we used bell and spigots to connect the 2 jackets with SeaShield FX70 grout, stainless screws and then proceed to grout with SeaShield 510 to the top of the jackets. After curing, SeaShield 526 epoxy was used to create bevel caps to finish off the jackets.

Left inset: The C-Grid Carbon Fiber double layer wrapped around the pile with fiberglass rebar before installing the SeaShield Series 400 FRP Jacket.

The SeaShield FRP Jacket at the mudline ready for plug to be installed.

The project has been completed and all parties involved were happy with the end results. This historic structure is now safer and can be used for many more decades.

Top view of the completed grout filled jacket before installation of the SeaShield 526 Epoxy Bevel cap.

Denso™ Protects Hi-Voltage Gantry Equipment in Highly Corrosive C5M Environment

Walvis Bay, on Namibia's coast, has one of the most corrosive environments in the world. The area is rated C5M – the highest level of corrosion risk – due to salty sea air, strong winds, and blowing desert sand. These harsh conditions cause metal parts to rust and wear out quickly.

A major electricity company had problems with corrosion on its high-voltage gantry equipment, including post insulators, long rods, and shackles. These parts were already galvanized, but it wasn't enough to protect them long-term in this tough environment.

To solve this, the company used a simple, easy-to-apply protective coating, Denso™ Paste, Denso™ Superlight Profiling Mastic, and Denso™ Petrolatum Tape™, over the galvanized metal. This added a second layer of defence against rust, helping the parts last much longer.

Top of photo shows an example of the severe C5M level of corrosion of the galvanised metal caused by this environment. In complete contrast the Denso Petrolatum Tape System offered superior protection which can be seen on the lower item.

The in-situ application of the Denso™ Petrolatum Tape system.

PROJECT SUMMARY

Product Type:
Coatings for Exposed Galvanised Metal

Country:	Namibia
Object:	Galvanised electrical equipment
Problem:	Corrosion prevention
Product Solution:	Denso™ Petrolatum Tape System

An electrical contractor was tasked with replacing several sections of the high-voltage (HV) gantries due to severe corrosion on components that had not been protected with wrapping. The corrosion had progressed to the point where some of the steel parts were no longer structurally sound and had to be removed

As part of this work, a number of Denso-wrapped sections were also removed, since they were connected to the corroded areas. Once the Denso wrapping was carefully taken off, the team inspected the components underneath and found them to be in excellent condition - with no signs of corrosion or damage. These parts had been fully protected, even after long-term exposure to Walvis Bay's harsh C5M-rated coastal environment.

This outcome provided clear, real-world proof of the effectiveness and durability of the Denso corrosion protection system. It demonstrated that, when applied correctly, our products can extend the service life of critical infrastructure and perform reliably even in the most aggressive environments.

Effective Denso™ Protection for Field Joints

Welded field joints are susceptible to corrosion from exposure to moisture, air, and chemicals, which can weaken their structure over time. To prevent this, a protective coating is applied, acting as a barrier to keep the joints safe from corrosive elements and extend their lifespan. After carefully considering the site conditions, the client decided to use Denso Primer D™ and Denso Ultraflex™ 1250 to protect the field joints.

Preparation of the welded joint surface, using a hand-held power tool.

Application of Denso Primer D™ at a width of 500mm on the field joint to ensure complete surface coverage for optimal adhesion

The surface was prepared using a hand-held power tool. Thereafter Denso Primer D™ was applied to the surface of the field joints. This primer was chosen for its excellent adhesion prperties, ensuring a strong bond between the joint and the protective materials.

Next, the joints were wrapped with Denso Ultraflex™ 1250. This tape was selected for its superior corrosion prevention capabilities. Each joint is carefully wrapped, and the PVC backing of Denso Ultraflex™ 1250 provides additional mechanical strength,safeguarding the joints from external elements.

PROJECT SUMMARY

Product Type:
Coatings for Buried Steel

Country:	The Republic of South Africa
Object:	Welded field joints
Problem:	Corrosion prevention
Product Solution:	Denso™ Ultraflex System

Below: The completed Denso welded joint protection.

Denso Bore-Wrap™ Protects Pipes During Trial HDD Installation in Aggressive Environment

Pipelines today are often installed via Horizontal Directional Drill (HDD) which can put the anti-corrosion coating at serious risk of being damaged during installation. In July 2024, Denso was invited to participate in a trial to evaluate the performance of multiple abrasion resistant outerwraps. The trial was set up to take place on a new pipeline near Lansing, Michigan.

PROJECT SUMMARY

Product Type:
Coatings for HDD Application

Country:	United States of America
Object:	Pipes for HDD application
Problem:	Protection from abrasion
Product Solution:	Denso Bore-Wrap™ System

There were two separate sites where the outerwraps would be applied on the leading edge of a section of pipe that would be installed via HDD in a very aggressive environment. For the application, the existing coating was quickly roughened using coarse sandpaper. The surface was then sprayed down with water, and the Denso Bore-Wrap™ was spirally wrapped using a 50% overlap and sprayed with water. Immediately upon completion of the Bore-Wrap application, the Denso Poly-Wrap was spirally wrapped with sufficient tension to temporarily compress the Bore-Wrap while it cures. The Poly-wrap was then perforated using the Denso Perforating tool, which allows excess gases, resin, and water to escape ensuring the layers of the Bore-Wrap do not separate while curing. The Bore-Wrap was completely cured in approximately 30 minutes. The Denso Poly-Wrap was left in place as a temporary UV barrier until the pipe was ready to be pulled, and then it was removed.

Opposite: The Denso Bore-Wrap at the leading edge is still in place 360° around the pipe.

Above: The Denso Bore-Wrap™ is fully intact on the left after the pull.

On the first section, the Denso Bore-Wrap™ was installed at the lead end of the pipe followed by an outerwrap from a different manufacturer. On the second section the Denso Bore-Wrap was applied as the second wrap on the pipe. Upon completion of the pull both outerwraps were inspected. The Denso Bore-Wrap proved to be the superior product in both locations. When placed first at the leading edge, the Bore-Wrap held up 360 degrees around the pipe after an initial gouge that did not make it past the very first circumferential double layer whereas the product supplied by the different manufacturer was gouged completely through at various areas throughout the full 360 degrees. This proves how the Bore-Wrap fabric sets itself apart from other types of abrasion resistant outerwraps. The multidirectional weave provides exceptional resistance in all directions preventing rocks from finding a seam and tearing completely through the path of least resistance. When placed second, the Bore-Wrap was still completely intact 360 degrees around the pipe. In both locations the Bore-Wrap completely protected the underlying anti-corrosion coating.

Above: The perforations allowing excess gas, resin, and water to escape during the curing process

It is because of results like this, that the application of Denso Bore-Wrap has become standard practice for many pipeline operators around the world in HDD installations. They know their anti-corrosion coating will be completely protected from any mechanical damage, therefore preventing corrosion for years to come.

Below: Application of the Denso Bore-Wrap System

Viscotaq™ Pipe Girth Weld Protection Used for Master Gas System Expansion Phase III Project

The Master Gas System Expansion Phase III in progress with girth welds receiving the Viscotaq™ HT System protection.

The Master Gas System is one of the world's largest hydrocarbon networks to transport gas to support industrialization. The Phase 3 project aims to convert a number of power plants from oil to natural gas, contributing a cleaner energy mix and its net-zero emission goal.

More specifically, package 10 requires a 56-inch pipeline to be laid from sector one STS-2 to sector two STS-1, over a total of 310 km, while package 14 requires a total of 212 km of 56-inch, 10-inch and 18-inch diameters to be laid in the Shoaiba area. The following will be installed on the pipelines: 18 mainline valves (safety valves to control the flow of gas), 12 launching and receiving stations (for cleaning and maintenance), and 26 burn pits (for disposal). A key part in each package is played by civil, mechanical and electrical instrumentation engineering.

PROJECT SUMMARY

Product Type:
Coatings for Buried Steel

Country:	Kingdom of Saudi Arabia
Object:	Girth welds on gas pipeline
Problem:	Corrosion Prevention
Product Solution:	Viscotaq™ HT System

The girth weld is cleaned before application of the Viscowrap HT Tape. Inset: Regular brushing of the prepared substrate to remove airborn dust and sand during the application, is unavoidable in a desert environment.

Application of the Viscotaq HT Tape.

Application of the Viscotaq PVC Outerwrap.

For long term protection Denso's Viscotaq™ HT System has been specified to protect 10" and 56" diameter girth welds on the gas pipeline. The system comprises an inner layer of ViscoWrap™ HT Tape with an outer layer Viscotaq™ PVC Outerwrap.

Denso and their agent in the region The Rezayat Group, have provided all relevant product application training to ensure that the Viscotaq HT System is applied correctly in accordance with the manufacturers specifications.

One of the girth welds protected with the Viscotaq HT System.

If you would like more information about our long-term corrosion prevention and sealing systems that deal with the problem areas listed below, simply tick the boxes and send us back this completed page and we will supply you with more information.

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