WINN & COALES INTERNATIONAL LTD

Denso Digest

Volume 31 - Number 3

Aqueduct protected with the Denso Steelcoat 400 System, Loch Katrine Scotland - see page 11,

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LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

Denso Protects Welded Joints on the Western Aqueduct Phase 2

The Western Aqueduct project is an enormous venture, with a rand value exceeding R 800million and is the largest water supply project in Durban's history. The project is designed to boost the supply of water to the Thekwini Municipal Area (Durban).

Phase 1, a 20Km pipeline from Umlaas Rd to the Inchanga Railway Station, was completed and Denso was used to protect the welded joints both internally and externally. Denso ST100 was used to repair the internal lining and Denso Ultraflex 1250 Tape was used to protect the external welds.

Phase 2, a 55Km project ranging from 1600Ø to 1000Ø pipe has been divided into 6 individual projects and will run from Inchanga through Alverstone, Hillcrest, New Germany crossing over the Umgeni River and into Ntuzuma.

All contractors involved in the project have their wrapping and linings teams trained and certified as competent applicators of the Denso systems. This allows for the client to rest assured that the products are being applied in the correct manner as per the specifications laid out in the documents.

The Denso ST100 Epoxy is being used to repair the internal lining. The surface is grit blasted to Sa2½ before a 400µ coating of Denso ST100 Epoxy is applied. The Denso ST100 has just had its potable water certificate renewed.

The Denso Weldbead and Ultraflex 1250 Tape is being used to protect the external welded joint. A mechanical clean to ST2 is required before the application of Denso Primer D, Denso Weldbead Tape and the Denso Ultraflex 1250 Tape.

After application of Denso Primer D the joints are overwrapped with Denso Ultraflex 1250 Tape.

For quick identification of the relevant product type used in each story we have used the following colour codes:

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

Arial view of the Western Aqueduct Project.

Project Summary	
Product type: Buried Steel Coating	
Country:	South Africa
Object:	Water pipeline
Problem:	Protection of joints
Product solution:	Denso ST 100 Epoxy Denso Ultraflex 1250

LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

Denso Keeps the Oil Flowing

A typical maintenance operation on Pembina Pipeline's NPS 20 Line in Northern Alberta.

Pipeline maintenance is part of daily life in Western Canada as it is in many different parts of the planet, although in Western Canada the sheer number of buried pipelines and an aging infrastructure makes it a thriving industry.

Project Summary	
Product type: Buried Steel Coating	
Country:	Canada
Object:	Oil Pipelines
Problem:	Corrosion prevention
Product solution:	Denso Interface Coating System

Fig 1. installation of a steel sleeve.

Fig 2. The Denso coatings are applied.

A very common scene throughout the Canadian Prairies is a crew huddled around an exposed pipe, removing the existing coating, inspecting for anomalies, reinforcing the pipeline back to its original strength and then recoating it.

This whole process is performed quite often for in-service lines so that the delivery of the product is not interrupted. Also, much of this type of work is done in our winter months, which affects the operating temperature of the pipeline and hence affects the coating selection for the recoat.

Denso Protal 7125 and the Denso Interface Coating System are widely used in pipeline maintenance because these products can essentially be applied to cold pipe, down to minus 20 Celsius for the 7125 and potentially colder for the Interface Coating System which is comprised of Denso Paste, Denso LT Tape, (possibly Denso Profiling Mastic) and Denso Glass Outerwrap.

After non-destructive testing or NDE is performed on the exposed sections of the pipe where it has been identified to have been compromised, a steel sleeve is installed on the pipeline (see figure 1), recoated with the Denso coatings (see figure 2) and ultimately buried again. The Protal 7125 is applied to the entire bare steel surface and the Interface Coating ties the newly applied 7125 back into the existing line coating which in this case is PE (see figure 3).

Many times in these situations Denso representation is called for on-site to ensure that the coatings are being properly installed because it is just too costly if they are improperly applied. More often these dig sites are in locations that are remote and hence very expensive to access, so everything has to be done correctly the first time.

Pipeline maintenance is a growing concern in Canada and using Denso coating products becomes essential to the integrity programs of all major pipeline companies in Canada.

Fig 3. The repaired section is complete.

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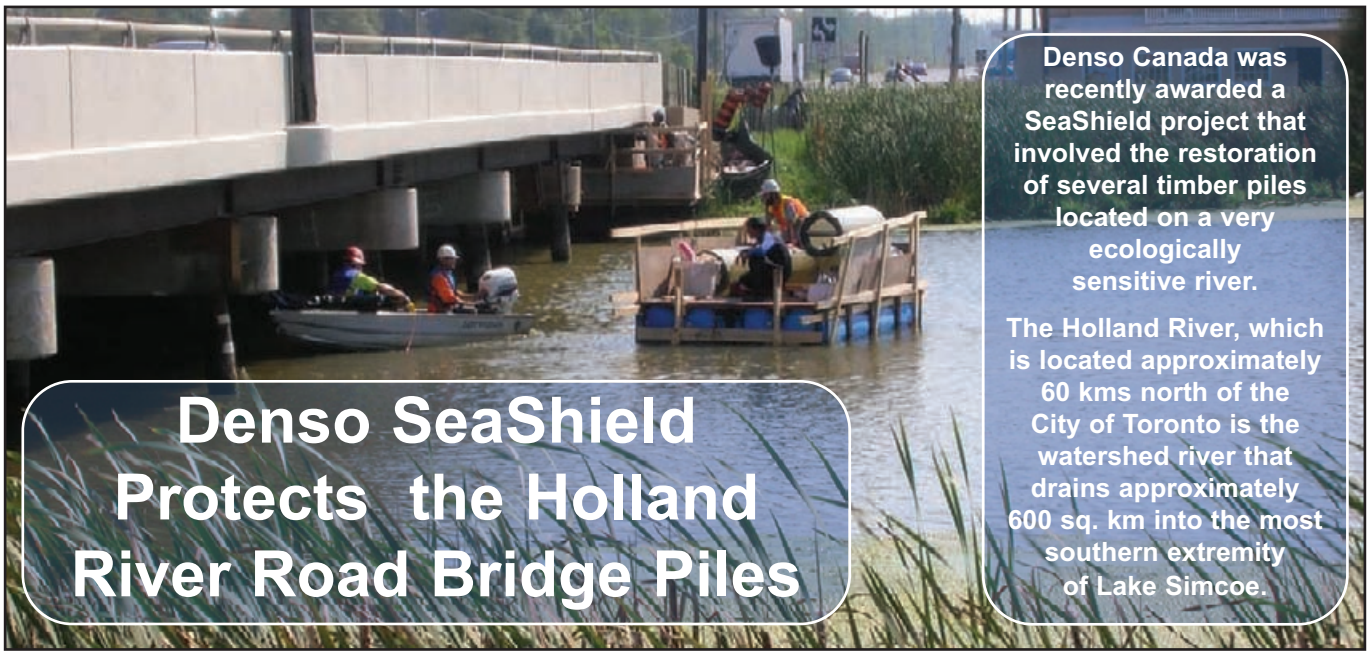


Denso SeaShield Protects the Holland River Road Bridge Piles

Denso Canada was recently awarded a SeaShield project that involved the restoration of several timber piles located on a very ecologically sensitive river.

The Holland River, which is located approximately 60 kms north of the City of Toronto is the watershed river that drains approximately 600 sq. km into the most southern extremity of Lake Simcoe.

The SeaShield 500 forms were taken to site by a barge towed by a boat.

Lake Simcoe is the fourth largest lake that is wholly located within the Province of Ontario and was named after Dutch born Captain Samuel Holland who was the first Surveyor General of British North America in 1783.

The piling project was part of an overall restoration of the Holland River Bridge which is located on Yonge Street, the longest street in the world and involved concrete restoration, expansion joint repairs and the repaving of the bridge deck as well.

The SeaShield Series 500 forms were taken by boat and barge out onto the river and affixed to specifically identified damaged piles. One of the piles was almost too badly crushed to affix the rebar cage and jacket around, but it was finally secured and pumped full of SeaShield 550 Epoxy Grout.

The project was completed in the late fall of 2013 and has now gone through one of the worst winters Ontario has had in many years. Upon seeing the piles in the spring of this year after the water subsided, they have all survived the tremendous snow and ice load without any damage.

Project Summary

Product type:
Sub Sea Splash Zone Coating

Country:	Canada
Object:	Concrete Bridge piles
Problem:	Damage
Product solution:	SeaShield Series 550

Rebar cage being fixed to the badly damaged pile.

The SeaShield 550 Grout is pumped into the SeaShield 500 forms.

LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

South Staffs Water Choose Denso Steelocat Protection

Denso Steelcoat 100/400/700 System was recently chosen by South Staffs Water to give long-term protection to a pipebridge over the River Stour near Stourbridge, West Midlands.

The specialist contractors for the project were Deborah Services Ltd, Industrial Services Division whose head office is in Wakefield, Yorkshire.

Following hand preparation to ST2 Standard using scrapers, wire brushes and emery cloth, the 30 metre water pipe was protected with a combination of Denso Steelcoat 100 and 400 tape wrap systems.The structural steework supporting the pipebridge was protected with the Steelcoat 700 System comprising two coats of Denso ST Epoxy followed by a coat of Denso Weathershield.

Project Summary

Product type:
Exposed Steel Coating

Country:	United Kingdom
Object:	Pipebridge
Problem:	Corrosion prevention
Product solution:	The Steelcoat 100/400/700 System

The Denso protected 30m pipebridge crossing the River Stour.

LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

Denso Steelcoat Protects Scottish Water Aqueducts

Scottish Water plc has recently completed a £7m project to upgrade aqueducts conveying water from Loch Katrine to Glasgow. The company says it was the biggest improvement to the aqueducts since they were constructed more than 150 years ago. The main contractors were George Leslie Ltd with Jacobs being the consulting engineers.

Project Summary	
Product type: Exposed Steel Coating	
Country:	Scotland
Object:	3 x Aqueducts
Problem:	Corrosion prevention
Product solution:	The Steelcoat 400 System

The Denso Steelcoat 400 System was chosen to give long-life protection to the 48" diameter pipes used at three structures which were virtually reconstructed along the aqueduct system. These carry two twin pipeline sections conveying 450 million litres of water per day to 1.3 million people.

Subcontractor Interserve carried out the Denso Steelcoat application comprising a coat of Denso Hi-Tack Primer followed by Denso Hi-Tack Tape overwrapped with Denso Ultraseal Tape. The system was completed with a coat of Denso Acrylic Topcoat.

Senior Project Manager Jim Clarke said "Due to the remote location and the changes in weather patterns throughout the refurbishment of the pipebridges, we had a number of challenges to overcome but we are highly delighted with the quality of the finished product. It was a pleasure being part of the team whilst carrying out this project for George Leslie and Scottish Water".

Over the combined length of the 'old' and 'new' aqueducts, there were more than 30 historic listed structures and planning permission for the repair work was conditional on full consultation with Historic Scotland.

Scottish Water's project manager, Simon Renton said "Strict adherence to constraints and restrictions was necessary to ensure that the character of the historic structures was preserved. Reconstructed areas of masonry on every part of the structure had to match the existing stonework and painting and protective coatings systems were carefully chosen to blend in with the surrounding structure.

Photos:
Above and underneath view of one of the aqueducts.

The Protal 7200 Air Cartridge Gun (1000ml)

On several recent pipeline construction and rehabilitation projects in Arkansas and Texas the Protal Air Cartridge Gun (1000ml) has been used in the spray application of Denso's Protal 7200. The projects included: 1.) rehabilitation of an in service 20" gate valve, 2.) coating of a 36" ball valve in a shop facility and 3.) fabrication coating of several bends and tees for a pipeline construction project. The advantages over brush application were considered to be speed of application, less equipment, less wasted material, and a more uniform dry film thickness (DFT).

Above: The Protal 7200 Air Cartridge Gun.

Left: Spray application of a 36" Ball Valve

First, the substrate to be coated was blasted to a near-white finish, SSPC-SP 10/NACE No. 2, while achieving a 2.5-5.0 mil anchor profile.
The Protal 7200 Air Cartridge (1000ml) is heated in a 1000 watt microwave to approximately 120°F - 135°F (49°C - 57°C).
Next the air mixing tip is tightened securely to the top of the air cartridge.
The cartridge is then installed into the gun while connecting the quick-lock air coupling to the air mixing tip. The cartridge is purged slightly before proceeding with the spray application.
Each cartridge is spray applied in approximately 1 minute and will cover approximately 15 sq. ft at 25-30 mils.

LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

Above: Spray application of a 20" in service gate valve.

Right: Spray application of pipe.

The Protal Air Cartridge Gun was designed for use with fast and easy setup, minimal material waste and equipment maintenance. Functionality is much improved by controlling airflow and fluid pressure right at the fingertips to give more precise control. Additionally, the spray gun includes a swivel handle and optional shoulder strap to provide comfort for all day spraying if required.

Project Summary	
Product type: Buried Steel Coating	
Country:	USA
Object:	Pipeline rehabilitation
Problem:	Corrosion prevention
Product solution:	Protal 7200 Air Cartridge Gun 1000ml

LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

SeaShield Protection for Timber Piles

The Appleton Dock Pile Rehabilitation Project at the Port of Melbourne was successfully tendered for by Denso (Australia) Pty Ltd and Professional Diving Services on reputation, project proposal and product selection.

The Appleton Dock, Port of Melbourne.

View of the timber piles beneath the dock.

The Denso SeaShield 400 & 70 Systems were the products of choice and specified by GHD for the rehabilitation of 1,200 timber piles ranging from 600mm diameter to 400mm in diameter. Protected pile lengths varied from 1.5 meters to 8 meters. The SeaShield materials used on this project comprised of 2,500 lineal meters of Denso fibre form jackets, 3,000sqm of Denso C-Grid® 450, 27,000 bags of Denso 510 u/w grout (30 x 20ft shipping containers), 5,500 rolls of Denso Marine Piling Tape and 7,000 lineal meters of Denso Glass Outerwrap FX.

This project took twelve months to complete and the resounding success of the project is being used as an example globally for the refurbishment of timber structures.

The SeaShield 400 System uses Fibre Form Jackets which are filled with Denso 510 Grout.

Project Summary

Product type:
Sub Sea Splash Zone Coating

Country: Australia
Object: 1200 Timber Piles
Problem: Rehabilitation
Product solution: SeaShield 400 & 70 Systems

Above: Applicaton of Denso Marine Piling Tape.
Below: The SeaShield 70 System is completed.

LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

Denso Protection for the Warren Water Main

South Australia Water is in the process of upgrading all major valves and fire plugs (underground hydrants) along the Warren Trunk Water Main.

The 32.5km Warren Trunk Water Main supplies water from the Swan Reach Water Treatment Plant to approximately 15,000 customers through the Barossa Region to Williamstown.

Products of choice for this upgrade are Densopol 60 with PVC overwrap as per SA Water TS 81 for the main pipework and the Petrolatum system as per SA Water TS 29 for the flanges and new hydrant and risers.

Project Summary	
Product type: Buried Steel Coating	
Country:	Australia
Object:	Pipeline, valves etc
Problem:	Corrosion prevention
Product solution:	Denso Tape Systems

Stage one of this project has now been completed and will extend the life of the main for at least another 50 years.

Densopol 60 Tape armoured with Denso PVC overwrap as per SA Water TS 81.

LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

The Denso Steelcoat Tank Base Protection System

Due to various design issues and operating conditions, the external base area of steel storage tanks is vulnerable to corrosion problems.

This is due to thermal and/or physical movement of the tank which causes cracking and is compounded by precipitation that runs down the side of the tank, collecting and laying in the same area. Water contaminants then enter any cracks between the concrete and steel, causing a steady deterioration of both materials.

Denso have developed an effective solution to this problem called the Denso Steelcoat Tank Base Protection System. The system seals the vulnerable area with a flexible but tough outer-armouring which is also highly weather resistant.

The Denso Steelcoat Tank Base Protection System was successfully used for the protection of a 15 metre diameter oil slop tank in the UAE. See photos below taken during the application.

Applying the Denso Hi-Tack Primer.

Applying Denso Primer D.

Applying the Denso Hi-Tack Tape.

The completed Denso Steelcoat Tank Base Protection System.

Project Summary	
Product type: Exposed Steel Coating	
Country:	UAE
Object:	Oil SlopTank
Problem:	Corrosion prevention
Product solution:	The Steelcoat Tank Base Protection System

LEADERS IN CORROSION PREVENTION & SEALING TECHNOLOGY

Denso Steelcoat System Protects Jetty Pipeline

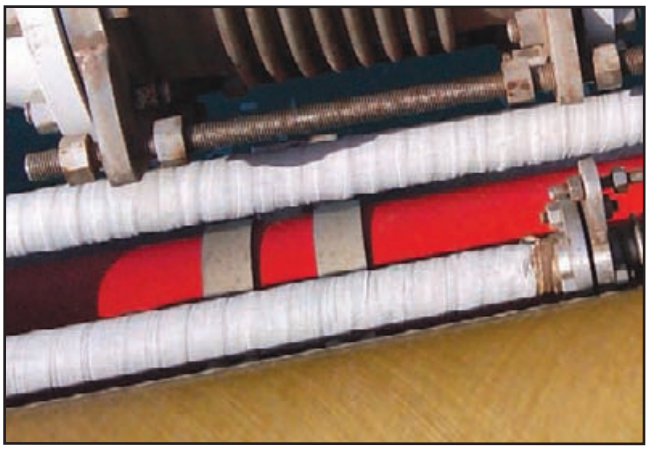
Project Summary	
Product type: Exposed Steel Coating	
Country:	Qatar
Object:	Jetty pipeline
Problem:	Corrosion prevention
Product solution:	Denso Steelcoat 400 System

The pictures show different stages of the application of the Denso Steelcoat 400 System

The Denso Steelcoat 400 System designed especially for the elevated temperatures found in the Middle East was successfully utilised for the protection of 2 No. 2 inch diameter pipes 9km in length one carrying oxygen and the other acetylene located on the quay/pier in a Qatar Port as shown in the photos.

The environmental conditions where the pipes are located are very harsh indeed with hot seawater with very high salt content spraying onto the piping, combined with extreme high ambient temperature and humidity.

Due to the very harsh environmental conditions the project consultant decided that the best solution for the long-term protection of the pipes was the Denso system. The modified system comprises a coat of Denso Paste overwrapped with Densyl Tape with a 55% overlap. This was then followed with Denso Ultraseal RT Tape with a 55% overlap which was then coated with two coats of white Denso Acrylic Topcoat.



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Denso Protal Protects Liquid Fuel Pipeline

The continuing business and population growth in Dubai, U.A.E. requires the expansion of its power generating facilities, consequently leading to increase in gas demand.

During 2013 Denso supplied approximately 11,000 Litres of Denso Protal 7200 which has been successfully utilized for the protection of the pipe girth weld joints and pipe bends on a 48 inch diameter liquid fuel pipeline. The pipeline tansports gas from a port to a Power Plant.

Our approved applicator A.P.S. - Anticorrosion Protective Systems L.L.C. successfully applied the Denso Protal 7200 by Heated Plural Spray machine.

Photos

Above: The construction of the 48 inch diameter liquid fuel pipeline.

Below:Pipe bends and girth welds coated with Protal 7200

Project Summary	
Product type: Buried Steel Coating	
Country:	Dubai, UAE
Object:	Gas Pipeline
Problem:	Corrosion prevention
Product solution:	Denso Protal 7200

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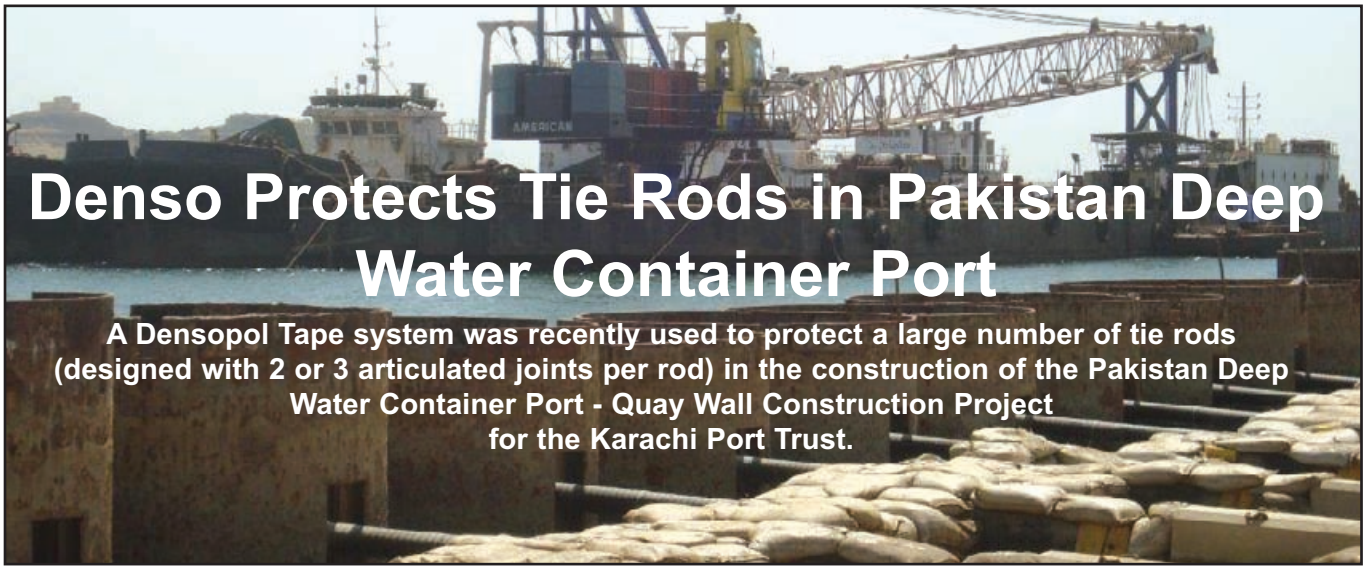

Denso Protects Tie Rods in Pakistan Deep Water Container Port

A Densopol Tape system was recently used to protect a large number of tie rods (designed with 2 or 3 articulated joints per rod) in the construction of the Pakistan Deep Water Container Port - Quay Wall Construction Project for the Karachi Port Trust.

The new quay wall showing the supporting tie rods.

As part of the tied bored pile quay wall design, the Denso protected tie rods were used to restrain a piled anchor beam that was positioned behind the quay wall. The anchor beam is supported by 1.6m diameter reinforced concrete piles, a design that has proven to have good earthquake resistance.

This project called for a large quantity of Denso materials and the system specified comprised Densopol 60HT Tape, with the large tie rod joints contoured with Densyl Mastic and overwrapped with Denso Self-Adhesive PVC Tape.

Machine wrapping the tie rods with Denospol 60HT Tape.

Project Summary

Product type:
Buried Steel Coating

Country:	Pakistan
Object:	Tie Rods
Problem:	Corrosion Prevention
Product solution:	Densopol Tape System

The Denso protected tie rods showing the articulated joints wrapped with yellow Denso Self-Adhesive PVC Tape.

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- ☐ Protecting pre-stressing and post tensioning bridge cables and ground anchorages.

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- ☐ Protecting and bonding

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WINN & COALES INTERNATIONAL LTD

Denso House, Chapel Road, London SE27 0TR

Tel: +44 (0) 20 8670 7511 Fax: +44 (0) 20 8761 2456 Email: mail@denso.net Web: www.denso.net

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