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**Denso
Digest**



QUALITY & INNOVATION FROM 1883 INTO THE 21ST CENTURY

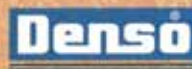


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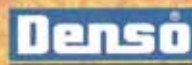
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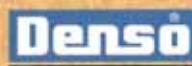
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New Spray Applied Protal Liquid Coating Gaining Popularity in Canada

For several years now, the Canadian gas transmission market has used the highly successful Denso Protal 7200 brush grade epoxy coating. This product quickly grew to become the epoxy coating of choice with most pipeline owners and contractors. Hundreds of thousands of litres of material has been supplied to projects such as the Alliance Pipeline, Trans Canada Pipelines, AEC, Pembina etc. on both new pipe construction and rehabilitation work.

A new generation of coating has recently been formulated based on the success of Protal 7200 and the introduction of Protal 7250 spray grade epoxy is now gaining momentum. This product is rapidly becoming the

and backfilling.

Besides its fast curing times, it exhibits high abrasion resistance, excellent adhesion, high temperature resistance and is safe and environmentally friendly.



Protal 7250 spray applied to pipelengths in the shop.

spray coating of choice across the country, where spray applications of epoxy on pipes, valves, fittings, tie-ins, road bores and directional drilling is completed, either in the shop or in the field.

Protal 7250 is VOC free, 100% solids epoxy and much like its complementary brush grade products, is specially formulated for use with fusion bonded epoxy pipe. Protal 7250 is a high build liquid applied in one coat and provides quick curing times for faster handling

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

Steel preparation is similar to brush grade epoxies whereby grit blasting to clean, near white metal finish, SSC-SP10/NACE No. 2, is required. Standard plural component airless spray equipment is used with a proportioning pump capable of generating a mixing ratio of 3:1.

Although supplied in 30, 90 and 800 litre kits, our success with this product has been such that we regularly sell it in 800 litre kits, followed by sales of 90 litre kits for very small jobs. Most Canadian applicators are now approved to use Protal 7250 and most pipeline owners specify its use for their spray grade requirements.

Field application by standard plural component airless spray equipment poses no problems.



Protal 7000 Used to Protect Ankleshwar Gas Transmission Pipeline

In a recent Gujarat Gas Company Ltd/British Gas joint venture for Surat in Gujarat State, India, all of the 2300 joints of a 33km, 12" diameter gas pipeline have now been protected with a single coat of Denso Protal 7000 solvent free epoxy.

As the pipelengths were factory coated with FBE before delivery to site, only the joints needed in-situ protection prior to burial. The joints were blast cleaned to Sa2½ immediately before the contractor, Punji Lloyd of Dehli, applied the Protal 7000 at the specified 750 micron wft/dft. Multiple coats of Protal were not required as the desired thickness was achieved in a single coat, saving all concerned a great deal of time. The Protal 7000 could in fact be applied at up to 1000 microns without sagging. The contractor was delighted at the speed of application and was able to protect up to 120 joints per day allowing the project to

run ahead of schedule. Daytime temperatures were in the range of 25-35°C and humidity 45-50% during the application period.

The Protal 7000 liquid coating system can be applied by brush, roller or airless spray and is designed for the long-term protection of buried metal pipelines, welded joints, valves, flanges and fittings. The material used on this project was supplied by K.Z. Trading Co., the Appointed Denso Agent in Mumbai and consisted of 550 x 2½ litre kits, each kit being sufficient to protect 4 joints.

This use of FBE factory applied pipeline coating instead of the more traditional 3 layer

PE was the first in India and has proved FBE to be a viable and competitive alternative. There was virtually no damage to the coating during transportation and handling, and all Protal protected joints were tested and found to be holiday free throughout (@5kV).

Brush application of Protal 7000 at 750 micron wft/dft.



Denso Protection for The Tank That Held Too Much Water

This show winning example of a 1968 Mk XI Chieftain Tank was bought for restoration when it was 'retired' back in 1996. It now spends most of its time getting plenty of TLC and refuelling at the Chequers Pub, Higham, Kent, just like the members of the trust that operate it; along with two Saracens, two Austin Champs, an Alvis Stolwart, and a '434'.

It is one of only a handful of Chieftains displaying in the country and recently won 'Best of Show - British Armour' at the 2001 Beltring 'War & Peace Show', the largest gathering of privately owned military vehicles in the world.

But before you rush out and buy one there are a few facts and figures that you should be aware of. The 650bhp blown 2 stroke vertically opposed, dual (12) piston, 6 cylinder (Deltic configuration) diesel engine does approx. 1 mile per gallon at best, rapidly dipping to half a mile per gallon off road! Get used to steering with what appear to be two huge brake levers that operate the massive regenerative steering gearbox and two disk brakes per track, each 700 mm in diameter and approx. $\frac{1}{8}$ of an inch thick.

You will need a rather large garage (36' x 13') with a heavily reinforced base (to withstand all 55 tonnes), and when you "fill 'er up" allow plenty of time to fill all six tanks with almost 1,000 litres of fuel. Your local garage will be greatly relieved to hear that you don't require an MOT, and amazingly it is tax exempt!

Yes you can take it out for a drive at any time, anywhere, but being an oversized load with a max speed of only 30mph it does require special police and council permission, lots of special permissions actually, and a crew

of three at least, and three or four escorting vehicles, and lots of time to navigate narrow roads and blind bends, etc, etc. They tend to take it out late in the evening and try to keep the whole thing 'low profile', as if a Chieftain on the A20 can ever be low profile! But generally speaking you will have right of way!

You will also have to contend with irate members of the general public convinced that you are destroying the road

it takes two men three full days and costs 192 x £6.00, being equivalent to a £1,152.00 tyre change every 60 miles!

And finally:

The Problem:

The tank that held too much water (it used to collect lots of rain!).

Solution 1:

Densoseal 16A was used to seal the Commander's 16 episcopes (fixed panoramic periscopes), the driver's main episcope and the gunner's sights after they were all stripped, cleaned and painted. 16A was also used to seal various cracks and voids in the additional (retro-fitted) armouring.

Solution 2:

Densyl Tape is being used to protect exposed threads and polished surfaces during ongoing restoration of major components.

Thereby making it "one of the



The Mk XI Chieftain Tank.

surface. What they are actually seeing is rubber crumb from the 192 rubber blocks that are inserted into the tracks specially for road use. Unfortunately they need replacing every two years,

driest tanks in the country", and by the way, anybody can buy one, but don't expect much change from £80k for what must be the ultimate weekend boys toy!

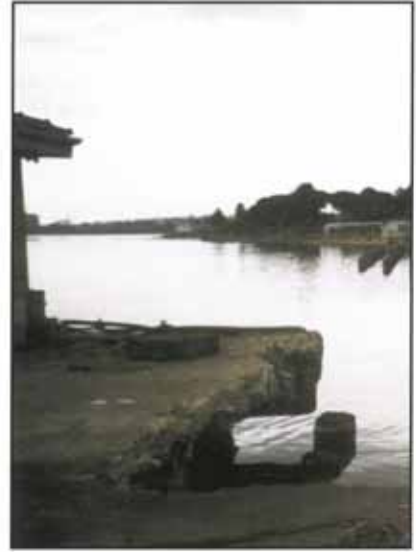
Jetty Renovation After 1999 Earthquake in Turkey

The earthquake that struck northern Turkey on 17th August 1999 caused widespread death and injury. Countless homes and commercial buildings were damaged beyond repair and much of the infrastructure needed extensive repairs to bring it back to efficient and safe working condition.

Among the structures that could be repaired was the Derince Jetty of Petrol Ofisi Anonim sirketi (POAS), a private sector oil company dealing with gasoline sales.

As part of the jetty renovation, 96 piles of 800mm diameter were cleaned and protected with the SeaShield 100 System utilising 2mm thick HDPE jackets secured with SS316 banding.

The materials were supplied by the local agent, A.R.S.I. Dis Tic A.S. who also gave technical assistance to the contractor on this project.



Top:
Picture foreground depicts some of the earthquake damage.

Opposite:
The jetty renovation underway.

Below:
The SeaShield 100 System in position.



Steel Piles Protected with SeaShield Series 2000HD System

After only 8 years in operation, a major USA west coast oil company's dock was suffering severe corrosion attack on its 90 each 18" diameter steel piles. The steel piles original coating had almost completely disbonded and was in urgent need of repair. California's strict environmental laws limited choice for a viable and effective coating. Due to the long history, ease of installation and outstanding durability, the Denso SeaShield 2000HD was selected as the system to be used on the project.

The project involved 20 feet of splash zone protection for 90 each 18" diameter steel piles. First, with hand tools, the piles were cleaned properly by removing all existing marine growth and rust. Sand blasting and high pressure water blasting is not required for this surface tolerant system. Next, the Denso Paste S105 was applied over the entire surface to be coated. Then, the SeaShield Marine Tape was applied spirally with a 55% overlap, starting from the bottom and proceeding upward. Finally, the SeaShield Series 2000HD Outercover, made from 80 mil HDPE and custom

fabricated to the exact size, were bolted and secured around the piles. The fastener bars are extrusion welded to the vertical length of the HDPE Outercover, creating a one piece system that does not require the use of straps. The Outercover is wrapped around the pile and the holes on the fastener bar are aligned and secured with special marine grade 316 stainless steel bolts.

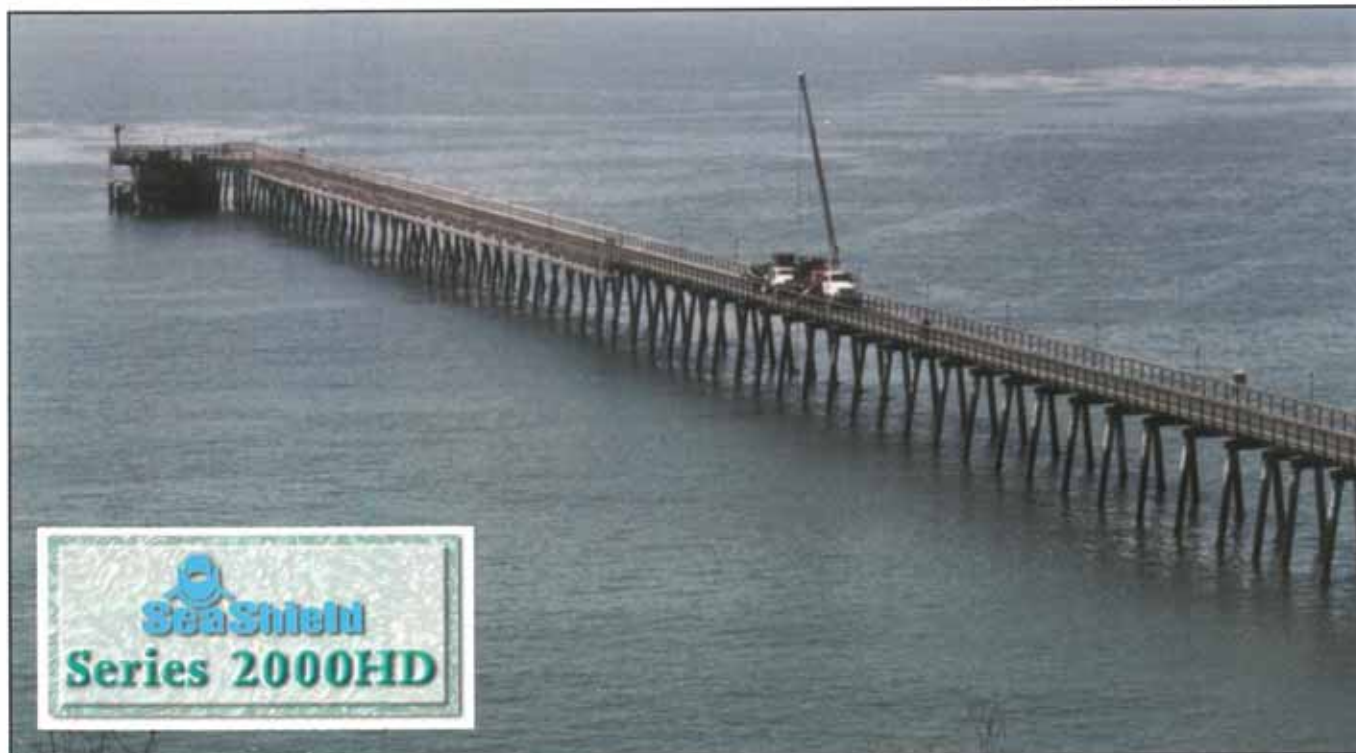
There are many benefits to the SeaShield Series 2000HD. First of all, installation is quick and simple with minimal surface preparation requirements. Secondly, the Outercover

provides a high impact and UV resistant tight sheath around the pile in aggressive environments. Most importantly, the piles are protected with a double layer of Denso petrolatum tape, which has a proven 70 year history of providing corrosion protection in severe marine environments.



Above:
The completed SeaShield Series 2000HD showing the fastener strip and marine grade 316 stainless steel bolts.

Below:
General view of the SeaShield protected jetty.



SeaShield
Series 2000HD

Tokstrip Used on Channel Tunnel Rail Link

Tokstrip flexible jointing strip is being used as the sealant between precast concrete box culverts that will form a storm water drain at Ashford on the Channel Tunnel Rail Link.

A total of 117 box culvert sections from Hanson Culverts, some measuring 1.5m x 600mm and others 1.8m x 600mm, will make up the drain outside Ashford Domestic Station adjacent to the Eurotunnel rail link currently under construction by Skanska, the main contractors for this phase of the rail link. Specialist sub-contractors for the storm water drain are Mackely Construction of Henfield, West Sussex.

Tokstrip has gained an enviable 40 year track record of use within the construction industry. To ensure its lead in the market place, it has recently

Opposite: Tokstrip Primer is first applied to the box culvert joint faces.

Below: Once dry, Tokstrip is applied to the primed surface.

been given a major revamp. Only one grade is required for all year round use. It is more user friendly and easier to handle and the standard Tokstrip primer is now fast drying. Under compression, Tokstrip deforms through the joint to provide a flexible watertight seal.



Denso Steelcoat 300 System Used for the Protection of Pipes in Confined Spaces

Asset owner United Energy, were faced with a bit of a problem when considering what corrosion prevention system to install when refurbishing two above ground natural gas pipes due to the fact they were located in fairly confined area.

Following the recommendation from well respected Oil and Gas Consulting engineers GCI Kenny, United Energy Australia chose the Denso Steelcoat 300 System as the preferred coating for refurbishing the two above ground pipes - 320 metres of 300 and 400mm NB were protected in total.

The pipes, located under the Spencer Street Bridge in downtown Melbourne, were in an area which demanded the need of a system that offered 'ease of application' in these confined circumstances. The surface tolerant Denso Steelcoat 300 System was ideal for this application. Designed for quick, cost effective, user friendly

application with an attractive finish without the need for traditional grit blasting that is required for liquid coatings, the system ensured easy application for the contractors.



Above:
There is no need for grit blasting when using the surface tolerant Denso Steelcoat 300 System.



Above and below:

The photographs illustrate a good finished application of the Denso Steelcoat 300 System regardless of the difficult access and confined site conditions.



Corrosion Prevention - Exposed Pipebridge

Denso Steelcoat Protection for Weardale Pipebridge

Northumbrian Water has just completed a renovation programme on a pipebridge over the River Wear at St. John's Chapel, Weardale, Co. Durham. The 37 metre long pipebridge carries both a potable and a raw water main and particular attention was given to renewing the protective system on the latter. Denso Steelcoat 400 System was chosen to give long-term protection.

Contractors, Advanced Engineering Solutions of Cramlington, first wire brushed the water main to remove all loose existing coatings, using an enclosed environment to prevent any coating particles falling in the river. They then applied Denso Profiling Mastic to joints and flanges to obtain a smooth

contour before the overall application of Denso Ultraseal Tape. This was then followed by application of a heavy duty Denso Acrylic Topcoat to complete the Denso Steelcoat System.

The Denso Steelcoat systems are designed for the long-term protection of above ground steel

structures and pipework. They are easy to apply, suitable for application in many difficult areas and ideal for steel surfaces which cannot be abrasive blast cleaned.

The Denso Steelcoat 400 System protected raw water main pipebridge, Weardale Co. Durham.



Denso Heatshield Special Protects Crude Oil Desalters

Denso Heatshield Special has been specified to give protection against internal corrosion for two desalter vessels at the North Sea Oil Terminal at Seal Sands, near Middlesborough, operated by Phillips Petroleum.

The vessels purpose is to remove water and unwanted minerals from the unstabilised crude oil. Each vessel is 3.6m internal diameter x 33m long and operates at 20 barg and a temperature of up to 110°C.

The desalters were previously coated internally with a corrosion resistant coating applied to the bottom third of the vessel which, at the time, satisfied the operating temperature criteria. It is anticipated that the vessels will operate within the existing temperature range with minor excursions to the maximum temperature quoted.

Deborah Services of Hartlepool spray applied the Denso Heatshield Special using a

Hydrocat spray unit where the coating first goes through a heater block in order to obtain a sprayable viscosity.



Above:
The two desalter vessels at the North Sea Oil Terminal, Seal Sands near Middlesborough.



Above:
Close up of the finished Denso Heatshield coating, well able to cope with the occasional vessel operating temperatures of up to 110°C.

Left:
Application in progress inside a vessel.



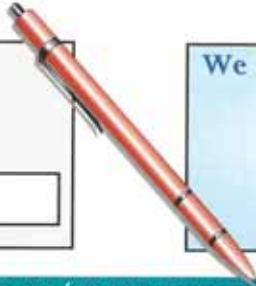
Front cover: Protal 7250 being spray applied to pipelengths in Canada (see story page 3).



Most Denso products are covered by patents and the words "DENSO", "DENSYL", "ARCHCO-RIGIDON", "DENSOPOL", "DENSOCCLAD", "TOKSTRIP", "CORROCLAD", "SYLGLAS", and "PROTAL" are registered trade names in the UK and many other countries.

Would you like more information about our long-term corrosion prevention and sealing systems?

If you are interested in any of the products featured in this issue of the Denso Digest please tick box:
 Please indicate page number(s):



We also offer tried and tested systems to deal with all the problem areas listed below, simply fax back this completed page and we will supply you with more information.

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- Maintenance corrosion protection for steel jetty piles.
- Subsea pipelines and outfalls.
- Protection of timber and concrete piling.

- Joint sealing of precast concrete manholes and culverts.
- Joint and crack sealing of asphalt road surface wearing courses.
- Joint sealing for airport runways.

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