Typical technical specification clauses for DRY-TREAT 100N

1 - GENERAL

1.1 Scope
The material to be supplied under this Contract shall be applied to specified concrete surfaces to protect concrete from the ingress of water and chloride ions. The material shall be designed to impregnate the concrete surfaces and permanently bond to the molecular structure of the concrete, thus changing its absorption characteristics. Impregnation shall be carried out on surfaces described in the Contract. All works shall be in accordance with relevant Occupational Health and Safety requirements.

2 - MATERIAL

2.1 Type
The material for impregnation shall be DRY-TREAT 100N (monomeric isobutyl triethoxy silane) is supplied by Dry Treat (Australia) Pty Ltd. The material shall be 100 per cent active with no diluting by solvent or any other fluid.

2.2 Properties and Certificate
Prior to the impregnation works the Supplier of the Material shall deliver to site sufficient material to carry out the entire works. The Supplier of the Material shall provide to the Superintendent, on delivery, a certificate from Dry Treat (Australia) Pty Ltd that it is pure DRY-TREAT 100N and the quantity delivered to site.

2.3 Storage
The material shall be stored in a cool, dry area protected from direct sunlight. The containers are to be kept sealed and protected from damp. The area shall display any required Occupational Health and Safety Signs.

2.4 Handling of Containers
The material containers shall remain sealed until their contents are required for use. The contents of any opened containers shall be either used within 72 hours or immediately decanted into 20 litre minimum 0.43 mm gauge steel drums and air tight sealed. If the material is contaminated it shall be discarded.

3 - SPRAY EQUIPMENT

3.1 Method of Delivery
A continuously circulating airless pump system with a large bore wand plus a nozzle with a 60° fan tip, providing a nozzle pressure not greater than 70 kPa shall be used to apply the material. Water shall be prevented from entering any part of the system.

4 - SURFACE CONDITIONS

4.1 Surface Condition
Surfaces to be impregnated shall be sound, air-dry and clean. Surfaces shall be free from loose matter and residues, curing membranes and release agents.

4.2 Cleaning
If cleaning by water methods, the surfaces shall be allowed to stand for a minimum of 24 hours before impregnation commences. Areas to be treated shall, where

necessary, be protected from adverse weather conditions and shall be surface dry for a minimum of 24 hours before application commences. Artificial drying of the surface shall not be permitted.

4.3 Adhesive Strength
The clean concrete substrate is suitable for treatment with DRY-TREAT 100N when an adhesive strength of 0.6 N/mm2 has been reached.

4.4 After Treatment
The treated surface must be left undisturbed (no rain or condensation) as long as possible and for a minimum six hours, to ensure proper curing before application of next coat.

4.5 Time for Treatment
Impregnation shall be carried out at not less than 28 days after the concrete has been placed, or 14 days where concrete repairs have been completed, unless laboratory test results demonstrate to the Supplier of the Material that the material will sufficiently penetrate the concrete, or a sample of the same concrete. Sufficient penetration shall be as determined by the Supplier of the Material.

5 - APPLICATION

5.1 Continuous Spraying
Impregnation shall be carried out as a series of continuous operations in a sequence agreed by the Superintendent. The material shall be applied by a continuous spray technique giving saturation flooding, working from the lowest level upwards. There will be a minimum run down of 150 mm and the treated area will have a "wet look" for five seconds. On soffits the material is to be applied to give a "mirror wet look" for at least five seconds per coat.

5.2 Application Rate
Two or more applications, with a minimum interval between coats of at least six hours, shall be made each at the coverage rate of 300 ml per sq.m.

5.3 Testing of Material
During application Dry Treat (Australia) Pty Ltd shall, when requested, provide to the Superintendent samples from the spray nozzle. This shall be tested to confirm refractive index values as stated in the material conformity certificate.

5.4 Tidal or Splash Zone
In a tidal or splash zone, application of the first coat shall not commence until the tide has reached its lowest level. Cleaning should take place as the tide recedes and the surface has no visual surface water. Allow the concrete to "dry out" for at least 14 days before applying the second, or more, coats repeating the same process.

5.5 Insitu Concrete in Tidal or Splash Zone
For insitu concrete placed in a tidal zone or splash zone, forms shall not be stripped for at least seven days, or as directed by the Superintendent, and the first coat application of material shall take place within 24 hours of stripping. In addition, stripping shall not take place if, in the opinion of the Superintendent, weather and/or tide conditions within the next 24 hours are not considered likely to be suitable for impregnation - for example rain or adverse wave conditions are anticipated.

5.6 Temperature & Weather Conditions
The outdoor temperature and the temperature of the substrate shall be within the range of -15 to 45 C°. Where the atmospheric humidity is extremely low in conjunction with a very dry substrate and a high outdoor temperature a light mist spray of fresh water shall be applied over the treated surface after the material has been absorbed. Impregnation shall not be carried out in rain or strong winds. Do not apply if rain is forecast within six hours following the application.

5.7 Protection
Bearings, painted steel surfaces, plastic, exposed bituminous materials and joint sealants adjacent to members to be impregnated shall be masked-off before impregnation. Members shall be protected from rain and traffic spray during application and for at least six hours after completion. Plants in the vicinity shall be protected against contact with the material.
Any residue formed by the material on glass, wood or metal shall be removed immediately by an alcohol based cleaning agent.

5.8 Visual Monitoring with Blue Dye
Additional visual monitoring of the application of the material shall be made by mixing "Blue Dye" supplied by Dry Treat (Australia) Pty Ltd at a rate of 0.2% ie 400 grams per 200 litres of the DRY-TREAT 100N material. The colour is not permanent and will disappear after a few weeks.

6 - TRIAL APPLICATION AREA & SAMPLING

6.1 Location
At least two control areas, each of not less than two square metres, shall be selected on the structure to be treated and marked out. One area shall have the material applied with a representative of Dry Treat (Australia) Pty Ltd in attendance. The other area is to remain untreated and used as a control. The location of the test areas shall be decided by the Superintendent and for comparison purposes will be at locations that are subjected to similar environment conditions.

On completion of the application on the control area(s) tests for the Depth of Penetration and the Reduction in Chloride Uptake shall be carried out. The Depth of Penetration shall be determined using the method set out in Clauses 6.3 while the reduction in Chloride Uptake shall be determined using the method set out in Clause 6.4.

When standards have been confirmed the contractor shall provide to the Superintendent, before the works commence, written confirmation from Dry Treat (Australia) Pty Ltd, that the works will be warranted to meet those standards.

6.2 Method of Sampling
The method of sampling shall be the same for all test procedures, and shall be as follows:

a. After a minimum of seven days following the last application of DRY-TREAT 100N, 50mm internal diameter cores shall be cut through the treated concrete ensuring that the core is perpendicular to the concrete surface. The depth of cut shall be 40 mm (+/- 5mm)
b. Whenever possible, coring shall be carried out using a vacuum-clamped coring machine. Where metallic fixings are used they shall be removed

subsequent to coring. Fixing holes and core holes shall be made good using an approved repair procedure.

c. The core shall be removed, sealed in a plastic bag, labeled and sent to an approved laboratory for testing.

6.3 Testing for Depth of Penetration by Dye Treatment

The following test procedure shall be used to determine the actual depth of penetration of the silane:

a. Test cores shall be obtained as per the procedure in Clause 6.2.
b. The cores shall be oven dried for 24 hours at 40 C.
c. The core shall be split diametrically and the split face sprayed with a water based fugitive dye.
d. The area not absorbing dye indicates the zone of silane treatment. The minimum distance from the interface of the dyed concrete shall be recorded. This distance shall be deemed to be the depth of penetration of the applied treatment. Should difficulty be encountered in distinguishing this interface a petrographic microscope shall be used.

6.4 Determining the reduction in chloride uptake following silane application.

The following test procedure shall be used for determining the reduction in chloride uptake resulting from the application of the silane:

a. Test cores shall be obtained as per the procedure in Clause 6.2. In similar fashion cores shall be cut from areas of untreated concrete as controls. The number of control cores shall be similar to the number of treated cores.
b. All sides of the cores, except the original face, shall be sealed with a solvent free epoxy resin paint to provide a water-tight film. If pin holing occurs a second or subsequent coat shall be applied.
c. The cores will then be totally immersed in a five molar salt solution at 23 °C (+/- 2 °C) with the original face upwards and 25 cm below the water level when immersed for 24 hours following by 24 hours drying at 40 °C. This regime of 24 hours immersion in the salt solution followed by 24 hours drying will continue for 28 days.
d. Upon completion of the test regime in (c), the cores shall be ground in increments of 10 mm, ie. 0-10 mm, 10-20 mm and 20-30 mm and the dust analysed for chloride content to BS1881.124-1988. Reduction of chloride uptake for treated cores as a percentage of the control cores shall be calculated as follows:

    Chloride uptake reduction = CU - CU1 x 100% CU
    CU - average chloride content per core control set
    CU1 - average chloride content per core treated set

6.5 Acceptability of Tests

On completion of the works the Superintendent shall mark per @ 300 sq.m. for a sample core to be tested for the depth of penetration. In any area where the treatment falls below the control standard, that area is to be retreated at the contractor's expense. If more than 30 per cent of the tests fall below the control standard, the entire structure shall be re-treated at the contractor's expense. Also, the treated cores shall show a minimum percentage decrease in chloride ion up-take of 90 per cent compared to that of the untreated control area, after

deducting the original chloride ion content.

7 - WARRANTY

7.1 Requirement
On the successful completion of the treatment Dry Treat (Australia) Pty Ltd shall warrant for a period of thirty (30) years that the treated exterior concrete will have a hydrophobic finish that will remain water and chloride ion resistant for a 30 year period from the date of practical completion.

8 - SAFETY

8.1 Fire Fighting
DRY-TREAT 100N is a combustible liquid. Open flames, sparks and heat must be avoided. Smoking is prohibited during application. Foam, water-spray, carbon dioxide and dry chemical extinguishers are suitable fire fighting equipment.

8.2 Toxicity
The material is of low acute toxicity but may irritate the skin. Contact with the skin and eyes should be avoided. Vapours from the material or aerosols should not be inhaled. The material is safe for the treatment of concrete in contact with potable water.

8.3 Respirators
Use organic filtered respirators where vapours or aerosols occur and, where ventilation is inadequate, use safety goggles and rubber gloves.

8.4 Eye & Skin Contact
After contact with eyes, skin or clothing, rinse out immediately with a large quantity of water and consult an eye specialist.

8.5 Spillage
After spillage do not allow the material to get into the sewerage or ground water systems. Dam the liquid in with sand and absorb with a suitable binder such as sawdust and take up mechanically.