

Note: This information has been prepared to assist in understanding the benefits to be gained by the use of C R P L (Aqueous Solution).

C R P™ L was developed to fill the need for a surface applied cost effective material to improve the durability of concrete.

Durability could be defined as: *“The capability of the concrete to maintain its serviceability over a specific period of time in a specific environment.”*

Australian Standard AS3600-1988-Section 4 contains specific provisions intended to prevent three distinctly different types of potential deterioration of concrete.:

- ❖ Corrosion of reinforcement
- ❖ Abrasion of floors and pavement
- ❖ Degradation by freeze thaw

These factors were considered in the development of C R P™ L (Aqueous Solution) which not only addresses these problems but assists in preventing many other forms of concrete deterioration.

C R P™ L (Aqueous Solution) has been tested for its effect on:

- ❖ Water permeability Test certificate No.0001
- ❖ Water absorption Test certificate No.0002
- ❖ Chloride Ions Diffusion..... Test certificate No.0003
- ❖ Impact Abrasion Resistance Test certificate No.0004
- ❖ Abrasion Resistance Test certificate No.0005
- ❖ Water retention efficiency as a curing compound Test certificate No.0015
- ❖ Corrosion inhibiting properties Test certificate No.0016
- ❖ Effect on carbonation Test certificate No.0019

Note: Freeze-thaw degradation is still to be tested.

The results of these tests prove the benefits to be obtained by treating concrete with C R P™ L (Aqueous Solution).

Water permeability (Certificate of Test 0001)

Resistance to chemical attack is related to permeability regardless of the nature of the aggressive agent. The lower the permeability the higher the resistance to chemical attack.

Treatment with C R P™ L (Aqueous Solution) lowers the permeability.

Water absorption – Sorptivity (Certificate of Test 0002)

Sorptivity is a measure of flow by capillary action – lowering the sorptivity reduces the amount of water that can be absorbed by the concrete in a given period of time and hence the amount of oxygen available for oxidation of the reinforcing steel. Treatment with C R P™ L (Aqueous Solution) lowers the sorptivity.

Chloride Ions Diffusion (Certificate of Test 0003)

The presence of chlorides in concrete can promote corrosion activity because the chloride ions can cause a breakdown in the passive layer that protects the reinforcement against attack. Chlorides may be present in the materials of the concrete mix or can enter the concrete from such sources as sea water, industrial pollution, acid etching and saline groundwater. Water penetrating the concrete picks up chlorides from the metal chlorides and causes corrosion of the reinforcing by consuming the oxygen present in the water.

Once the corrosion process has been initiated it is fuelled by oxygen from the atmosphere and further water ingress.

The rate at which chloride ions diffuse in the concrete effects the rate of corrosion.

Treating concrete with CRP™ L (Aqueous Solution) significantly reduces the rate of chloride ions diffusion.

Abrasion Resistance (Certificate of Test 0004, 0005)

Surface hardness is a major factor in the abrasion resistance and hence the durability of a trafficked concrete surface.

The abrasion and impact abrasion resistance tests conducted by A.I.A. Pty Ltd show that concrete surfaces treated with CRP™ L (Aqueous Solution) show a significant increase in abrasion resistance with material mass and volume losses from the surface being reduced by up to 40 times.

Water retention (Certificate of Test 0015)

CRP™ L (Aqueous Solution) is not a curing agent but is sometimes applied to concrete 12-24 hours after laying to:

- ❖ Reduce the risk of surface failure
- ❖ Increase the surface hardness
- ❖ Reduce impermeability and water absorption
- ❖ Provide additional re-bar protection

when used for this purpose CRP™ L (Aqueous Solution) reduces the water loss during curing by 24%.

Corrosion inhibiting properties of concrete for steel reinforcement (Certificate of Test 0016)

As no Australian Standard exists for determining the corrosion inhibiting properties of concrete for protections against reinforcing steel corrosion the polarisation curves method was chosen.

As a result of this testing it was determined surface treatment of concrete with CRP™ L (Aqueous Solution) can change the steel reinforcing from an active condition (possible intensive corrosion) to a stable passive condition (no corrosion possible).

Carbonation of concrete (Certificate of Test 0019)

Carbonated concrete is concrete whose cement stone compounds have reacted with CO₂.

The hydration of Portland cement in concrete results in a highly alkaline environment around the reinforcing and the formation of a passive ion oxide film on the bars that prevents dissolution of the iron. If however the surrounding concrete becomes carbonated as a result of carbon dioxide (CO₂) penetration the alkaline environment can be destroyed, passivation lost and corrosion results. Treatment of concrete with CRP™ L (Aqueous Solution) dramatically increases the resistance of the concrete to carbon dioxide penetration.