

# AQUAPLATE® STEEL FOR WATER TANKS

## TECHNICAL BULLETIN TB-3

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This issue supersedes all previous issues

BlueScope AQUAPLATE® polymer coated steel has been specifically developed for the fabrication of water tanks and is the only product recommended by BlueScope Steel Limited for this application. AQUAPLATE® steel comprises traditional zinc-coated steel sheet laminated with a food grade polymer film.

The many variables in water quality that affect the performance of other steel tanks do not affect the service life of a tank made from AQUAPLATE® steel. This is because the food grade polymer lining acts as a barrier and prevents any metal to water contact.

AQUAPLATE® steel overcomes the factors that create uncertain tank performance, therefore a 20-year warranty is available on the material component (*AQUAPLATE® steel*) of the tank when used for the storage of drinking water ie “potable water”. This is regardless of the source of the water, whether river, bore or rain water collected from a roof, provided it is potable.

### MATERIAL SPECIFICATION

#### **AQUAPLATE® steel for tank walls and lids:**

The polymer film for tank walls and lids is always located on the inside of the tank. The reverse or outside surface is treated with a clear, weatherable water-based lacquer. The primary function of the lacquer is to minimise early dulling of the outside finish.

BlueScope Steel AQUAPLATE® steel is also available with a prepainted finish that allows the tank to blend in with the architectural features of your home.

#### **AQUAPLATE® steel for tank bases:**

Tank bases have the polymer film on both sides of the zinc-coated steel substrate. The polymer film is not UV resistant and should not be exposed to sunlight

#### **Polymer Film:**

The polymer film is a 200µm thick, food grade material manufactured in accordance with Australian Standard AS 2070, Part 2, “Plastic Materials for Food Contact Use”.

#### **Steel Substrate:**

ZINCFORM® G300S Z450 steel is used as the substrate in the manufacture of unpainted

AQUAPLATE® steel. Prepainted AQUAPLATE® steel is manufactured using a substrate of ZINCFORM® G300S Z275 steel.

#### **Corrugations:**

The corrugations for the tank walls comply with Australian Standard AS 1445.

### PERFORMANCE

#### **Water Types**

The type of roof material, be it cement or terracotta tiles, aluminium, ZINCALUME® steel or COLORBOND® steel will not affect the life of a tank made from AQUAPLATE® steel when recommended installation procedures are followed.

Potable river, bore and town waters may also be collected and do not cause the corrosion problems associated with other steel tanks.

#### **Thermal Resistance**

Do not store water at temperatures in excess of 65°C.

#### **Chemical Resistance**

The polymer lining on AQUAPLATE® steel should not have prolonged contact with the following chemicals:

- alkalis of all concentrations
- mineral acids of all concentrations
- petrol, kerosene, mineral turps and alcohol
- water solutions of inorganic compounds

The product should not be permitted to come into any contact with:

- low molecular weight organic acids such as acetic, lactic, formic and stearic acids
- aromatic hydrocarbons (*eg. toluene*)
- chlorinated hydrocarbons (*eg. 1,1,1-trichloroethane*)
- ketones (*eg. Methyl Ethyl Ketone*)
- esters (*eg. cellosolve acetate*).

#### **Exposure to Sunlight**

The polymer film is NOT resistant to ultra violet light and degradation will occur progressively by embrittlement if the lining is exposed to sunlight. In addition, the growth of algae is encouraged by sunlight. Therefore all tanks must be fitted with a suitable lid.

## METHOD OF CONSTRUCTION

Tanks made from AQUAPLATE® steel are fabricated in a similar manner to other steel tanks, but it is essential to note that soldering is not appropriate.

AQUAPLATE® steel is a sophisticated material which requires care to protect the integrity of the film during tank fabrication. The fabrication methods employed MUST AVOID FILM DAMAGE. Unrepaired damage will substantially reduce tank service life. Refer to Forming Bulletin TB-F9 for information on tank fabrication using AQUAPLATE® steel.

After fabrication, the tank interior should be inspected carefully to prevent damage to the polymer laminate and all exposed steel sheet edges and exposed rivets or screws sealed with a neutral cure silicon sealant. Any cuts in the film should also be repaired with sealant. (see *Technical Bulletin TB-9 for details of sealants*).

### Open Seams on Outside of Tank

It is recommended that the open seams on the outside of the tank be sealed against water ingress as this could cause corrosion.

### Cure Times

Prior to filling the tank, the sealant must have sufficient time to cure in order to ensure that the sealant is able to withstand the load of water. Refer to the sealant manufacturer for information regarding cure time.

## TANK INSTALLATION AND CONNECTION

### Location

Ideally the tank should be located in a shady site away from trees to prevent debris clogging the strainer resulting in contamination of the water.

### Tank Base

Tanks should NOT be placed directly onto the ground.

The tank must be installed on a firm, stable platform with no overhang of the tank over the edge. Tank stands must be engineered to support the tank safely when full of water. (*Water weighs one kilogram per litre*).

As tanks made from AQUAPLATE® steel are supplied with a protective membrane under the base, they may be placed directly onto a concrete pad or timber platform.

### Accessories

Modern accessories for water tanks must be designed to give a long life to match that of the tank itself. Do not use copper fittings for any part of a tank made from AQUAPLATE® steel.

### Inlet Strainers

Anodised aluminium mesh is recommended for inlet strainers. Copper or copper alloys must not be used. ZINCALUME® steel or plastic are suitable materials for the strainer surround, but ZINCALUME® steel must not be continually immersed. The strainer must be located above the water level.

A PVC overflow with appropriately contoured flanges or a stormwater pipe adaptor should be fitted and a gauze filter should also be fitted to exclude mosquitos.

### Outlet Fittings

Copper and its alloys MUST NOT be used for fittings connected to an AQUAPLATE® steel water tank. If a copper outlet pipe is used, at least two metres of food grade plastic tubing must be installed between the copper pipe and the tank.

### Wash Tanks Before Use

All tanks must be washed out after fabrication and before being put into use. The purpose for this action is to remove contaminants which may have developed during the many processes involved in producing the AQUAPLATE® steel and its subsequent rollforming, transport and fabrication into a tank.

### Cuprosolvency

Waters of low pH and low alkalinity are aggressive to copper pipes and may dissolve some of the metal. Even minute quantities of dissolved copper will deposit a green/blue stain within residual soap films occurring on household wet area surfaces. This colour does not originate from the polymer film on AQUAPLATE® steel, the tank itself or prepainted roof surfaces, such as COLORBOND® steel.

### Odour and Taste

Care should be taken to ensure that contaminants are not introduced into the water tank.

In the event that any odour or taste is noticed in water coming from a tank made from AQUAPLATE® steel, the catchment area should be checked for contaminants such as lichen or deceased animals as these are known to effect water quality.

Experience has shown that slight odours or tastes associated with the water from a new tank made from AQUAPLATE® steel will disappear after the tank is flushed out.

## **PAINTING OF EXTERIOR TANK WALLS**

To allow the tank to blend in with the architectural features of your home AQUAPLATE® steel is also available with a prepainted steel substrate.

In some cases the tank may need to be painted after installation. This may be for enhanced corrosion resistance in aggressive conditions such as coastal or industrial sites, or alternatively the reason may be for appearance where a colour is required for aesthetic or environmental reasons.

### **Procedure for Painting**

#### **1. Surface Contamination**

Ensure that any surface contamination is removed prior to painting, by washing the surface with a mild solution of pure soap or non-abrasive/non-ionic kitchen detergent in warm water, followed by rinsing with clean water and drying with a clean, dry cloth.

#### **2. Priming Coat**

The use of a priming coat is recommended for all weathered galvanized steel. For new installations a water-based, solvent resistant primer should be applied over the clear water-based lacquer.

#### **3. Top Coat**

Any exterior paint type, compatible with the chosen brand of primer may be applied. Paint manufacturer's recommendations should be strictly adhered to. Typically a water based acrylic system is suitable for non-aggressive locations whereas more corrosion resistant systems are recommended for aggressive locations.

## **GOOD PRACTICE WITH DRINKING WATER TANKS**

1. Wherever possible, all sections of inlet pipes should be directed down and rainwater should flow into the top of the tank. The inclusion of rising section will provide potential traps for sediments, biofilms and stagnant water and these should be avoided.<sup>(1)</sup>
2. The first fill collected should be discarded to prevent contamination of the collected water from any contaminants which may arise during fabrication or transport.
3. If a roof is to be post painted, always check the suitability of the paint for collection of drinking water.
4. Do not collect drinking water from lead, copper or copper treated timber.
5. The build-up of, or immersion in, dirt and/or detritus around the bottom of the tank walls must be avoided.
6. The build-up of detritus on the leaf strainer should be avoided to prevent overflow of catchment water directly onto the exterior surface of the tank lid and walls, creating an inert catchment corrosion problem. (*Refer TB – 15*)
7. The design of the tank overflow pipe should ensure that water discharged from the overflow is directed clear of the tank walling. (*Refer TB – 15*)
8. Internal access to the tank is discouraged, as this may result in damage to the polymer lining leading to premature failure.

<sup>1</sup> National Environmental Health Forum - Guidance On Use Of Rainwater Tanks, 1998

The information and advice contained in this Bulletin is of a general nature only, and has not been prepared with your specific needs in mind. You should always obtain specialist advice to ensure that the materials, approach and techniques referred to in this Bulletin meet your specific requirements.

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