bushfire CRC

RESEARCH AND INVESTIGATION INTO THE PERFORMANCE OF RAIN WATER TANKS IN BUSHFIRES

A recent research project involving the Bushfire Cooperative Research Centre (Bushfire CRC) and the CSIRO has revealed that different types of rainwater tanks can play an important role in defending houses against the threat of a bushfire.

The research project was conducted in the NSW Rural Fire Service experimental research facility at Mogo on the south coast of NSW.

The research investigated the effects of typical Australian bushfire exposures on both residential and commercial water tanks of steel and plastic construction.

The project received support and cooperation from BlueScope Water.

THE RESEARCH

Anecdotal evidence already exists to suggest that steel water tanks offer greater protection to both residential and commercial properties in the event of a bushfire than alternative materials because of its non-combustibility.

The full results from this research will be used by the Bushfire CRC and the CSIRO to:

- Influence how building codes and planning guides are developed, particularly around bushfire risk areas;
- Help provide advice to property owners on the level of risk their homes and businesses face; and
- Help develop education programmes for local communities.

RESULTS

1. BLUESCOPE WATER WATERPOINT® STEEL CONSTRUCTION

Of the different materials tested, spiral wound, steel tanks performed best under all exposure conditions. All steel manufactured tanks maintained structural integrity when faced with a 30-minute flame immersion test, simulating an adjacent structural fire (see table overleaf for further details on exposure levels).

2. PIONEER WATER TANKS GALAXY STEEL CONSTRUCTION WITH AQUALINER®

Steel construction liner tanks maintained structural integrity during all tests. The liner construction proved able to retain water during and after the fire-front, which is critical for the protection of property and assets in the event of a bushfire.

3. POLYETHYLENE (PLASTIC) CONSTRUCTION

Polyethylene tanks suffered considerable structural distortion during simulation of a bushfire passage. The tanks demonstrated structural deformation during the 30 minute flame exposure, resulting in the tank splitting itself and melting down. Polyethylene tanks were at risk of total failure when adjacent combustible items are present, in the form of forest litter, fences or other polyethylene tanks.

LEFT: WATERPOINT ®CLASSIC DURING TESTING AND
ABOVE RIGHT: STEEL CONSTRUCTION TANK AFTER FIRE FRONT

THE TABLE BELOW OUTLINES THE LEVELS OF EXPOSURE THAT EACH TANK PRODUCT WAS EXPOSED TO AND THE RESULT OF THE EXPOSURE

RIGHT: PIONEER GALAXY TANK DURING TESTING

LEVEL OF EXPOSURE	BLUESCOPE WATER WATERPOINT® STEEL CONSTRUCTION (CONVENTIONAL)	PIONEER WATER TANKS GALAXY STEEL CONSTRUCTION WITH AQUALINER®	POLYETHYLENE CONSTRUCTION
1. LITTER IGNITED Leaf Litter placed typically around the base of the tank and ignited to investigate and observe the influence of small amounts of leaf deposition during the fire event.	No structural damage or water loss recorded	No structural damage or water loss recorded	Small ignition of tank around base, combustion of polyethylene to a depth of 20mm in one localised area. Indication of possible risk when fuel accumulation is higher. No loss of water recorded.
2. LITTER IGNITED + PRE-RADIATION Typical of an advancing bushfire occurring on a fire danger day of FDI* 40 but with sufficient clearing to avoid direct flame contact with the tank.	No structural damage or water loss recorded.	No structural damage or water loss recorded.	Tank melted and deformed to level of water, some leaks from bottom of tank detected, front surface involved in flaming combustion. Findings indicate plastic tanks require clearance zone of around 30 metres, free of excess leaf build up, combustible material or other plastic tanks.
3. SIMULATION OF STRUCTURAL FIRE **Full continuous flame immersion for a period of 30 minutes. Designed to simulate a worst case structural fire.**	Scorching of the tank, no structural damage. Small leaks recorded at a rate of less than 2 litres per minute only recorded after a 30 minute flame immersion.	Small loss of water over the top of the liner, tank maintains its structural integrity in 30 minute flame immersion.	Tank split and collapsed, emptying itself and melting down. Complete failure of the tank observed.

Note: Ember attacks can occur before, during or after the main fire event. Hence, this structural impact can create risks for the occupants in a number of different ways. * FDI - Fire Danger Index

STEEL TANKS SIMILAR TO THOSE EXPOSED ARE SUITABLE FOR SUPPLYING WATER DURING BUSHFIRES

FURTHER INFORMATION

For more information on the testing, contact Richard Thornton at the Bushfire CRC.

(03) 9412 9608 or
visit www.bushfirecrc.com

The Bushfire CRC and its researchers involved in this project acknowledge the support of BlueScope Steel for this project and the valuable collaboration of the NSW Rural Fire Service which is a partner in the CRC.

This research was conducted as part of Project D1 ***Protecting People and Property***, part of the Bushfire CRC's national research program.

LEFT: TESTING OF POLYETHYLENE RAINWATER TANKS

The Bushfire CRC is part of the Australian Cooperative Research Centres program - www.crc.gov.au