



# Anti-Flush Seal

Anti-flush Seal is a highly modified bitumen emulsion designed to stop the flushing caused by water vapour venting through chip seal layers. It aims to cap off this venting and therefore prevent the movement of bitumen to the surface, which stops flushing. Anti-flush Seal is a high binder content emulsion providing an extremely tough, waterproof layer which does not allow bitumen to migrate to the surface of the seal.

## Where to use Anti-Flush Seal

Anti-Flush seal is a binder for chipsealing application, specifically designed for sites characterized by:

- Low texture
- Stress factor 1 to 6
- High seal layers 4+
- Historic of standard seal failure due to flushing within 2 years

## Benefits

- Stop the flushing due to venting from occurring
- Provides the most practical method to stop flushing
- Ability to extend the seal lifespan
- Safe application temperature compared with hot bitumen delivered products
- Applied using standard sprayers

## Problems solved



REDUCED  
EMISSIONS



LIFE  
EXTENSION



CRACKING



CHIP LOSS



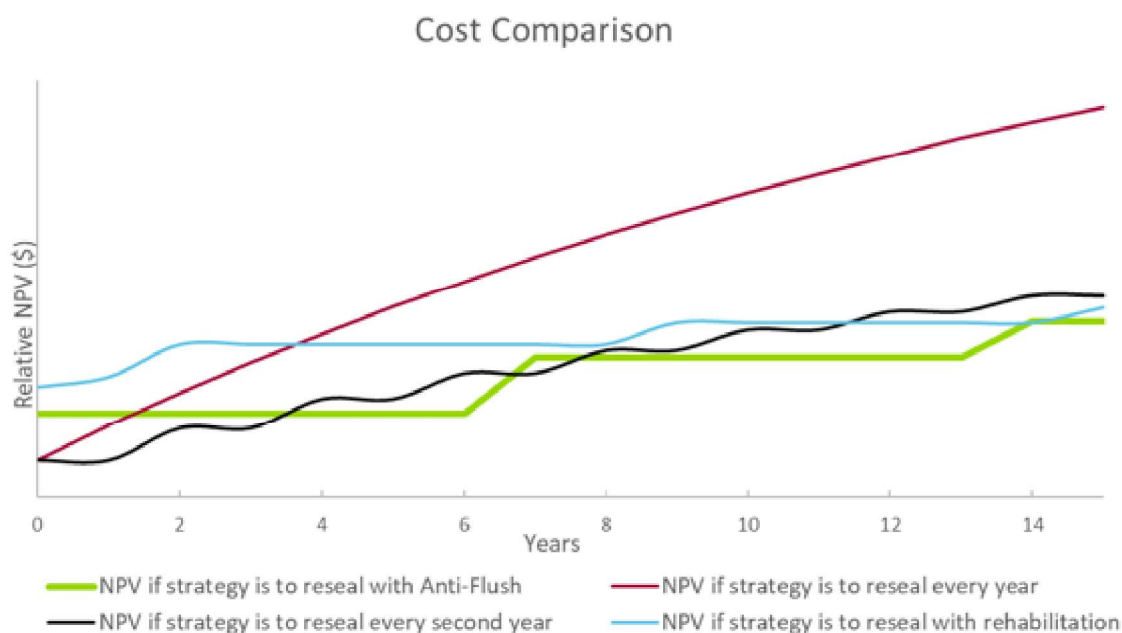
WATER  
PROOFING



FLUSHING

## Figure

The following figure provides a comparison between the current resealing strategies' NPVs (Net Present Value) and the Anti-Flush seal strategy, based on real-life data. The data suggests that a flushing site is typically chip-sealed every second year and may need resealing annually due to fast degradation rates. The extrapolation shows that although the initial investment in Anti-Flush seal is higher than that of a standard seal, the cost can be recovered within 1.5 to 3.5 years due to its superior performance and longer service life. Alternatively, road surface rehabilitation is another option, but it is expensive and lasts only a few years, making Anti-Flush seal a more cost-effective solution.



## Specification

### Typical properties of Anti-Flush Seal:

Property	Method	Specification
Binder Residue (%)	In-house method	>73.5%
Viscosity at 55°C (cps)	In-house method	450 - 650

## Health and Safety

Anti-Flush Seal is handled at medium temperatures (~50°C) and all precautions should be taken to prevent burns. Full personal protective equipment must be used at all times when pumping, transferring or sampling. Burns should be treated in the same way as hot bitumen burns. The Rading NZ Bitumen Burns card should be consulted and the instructions followed, e.g. cooling water should be immediately applied but no attempt should be made to remove bitumen from the burn area. Any contact on the skin (other than burns) should be washed off immediately with appropriate hand cleaners, do not use solvents. A safety data sheet for is freely available on the Road Science website and must be read and understood prior to handling the Anti-Flush Seal.



## Handling & Mixing Information

### Anti-Flush Seal:

Maximum safe handling temperature	60°C
The Anti-Flush Seal should be circulated for at least 10min prior to commencing spraying, but should not be circulated for extended time.	
Normal Spray Temperature	50°C -55°C
Normal Pumping Bitumen Emulsion Temperature	40°C -55°C

Anti-Flush Seal is a water based system and as such care should be taken with regard to risks associated with rain and runoff. Normal environmental control precautions for the use of emulsions should be taken.

Anti-flush Seal does have a longer curing window than standard bitumen emulsions. The option of using Anti-Flush is available in Zeus, continue to use Zeus for sealing decision-making.

## Storage

### Anti-Flush Seal:

Short Term Storage Temperature (2 days)	50°C
Medium Term Storage Temperature (2 to 5 days)	25°C
Long term storage temperature (beyond 5 days)	25°C
<p>Critical: Long Term Storage</p> <p>If there is a need to postpone spraying beyond 2 days, storage temperatures should be dropped immediately to 25°C to reduce the risk of skinning.</p> <p>Do not recirculate Anti-Flush Seal over extended period of time as the emulsion will break.</p> <p>Never allow Anti-Flush Seal to freeze, as the emulsion will break.</p>	
<p>Critical: Rate of heating</p> <p>Reheating needs to be undertaken slowly with the rate of heating not exceeding 10°C per hour. Gentle circulation is required during heating. Never heat beyond 60°C.</p>	



## Sampling

---

Samples should be taken following transfer from storage or transport. PPE as defined in the Material Safety Data Sheet should be worn when sampling Anti-Flush Seal, including face shield as the product is transferred at slightly elevated temperatures and splashes are always a risk.

## Application

---

Anti-flush Seal is applied using a catalogue 3/5 sandwich seal design with a wet emulsion application rate of 2L/m<sup>2</sup> (1.5L/m<sup>2</sup> residual). Application rate to be confirmed using the Downer chip sealing design algorithm on a site-by-site basis. Anti-flush Seal can be applied using standard emulsion application equipment and methodologies.

## Cleaning of the equipment

---

Flush tank, spray bar, hand lance and pump thoroughly with standard emulsion right after use to avoid build up and ensure equipment does not have any blockages. Ensure all the product is sprayed out, and none remains in the tank below safe minimum heating level. Transfer into IBCs if required.