

# FIBERTITE MEMBRANE

## INTRODUCTION & COMPARISON

RoofLogic is proud to be the New Zealand supplier of Fibertite membrane.

As we talk to architects, main contractors, building owners, facility manager's and professional roofing installers around New Zealand there are a number of questions that we are often asked about Fibertite roofing membrane.

Some of these questions include:-

- On what basis do you make the claim that Fibertite is the world's best roofing membrane?
- I'm used to specifying two-layer torch-on systems, why should I change to specifying Fibertite?
- Is Fibertite like a TPO membrane?

We have summarised below what we see as some of the key benefits and performance characteristics of the Fibertite membrane. If, having read this paper, you need further information or would like further supporting documentation, then please contact the Technical Team at RoofLogic.



## DURABILITY

The Fibertite KEE membrane was first introduced in to the market in the United States in 1979. The oldest roofs are therefore almost 40 years old and are still performing. These roofs have been installed in a wide range of different environments. In terms of durability I would summarise the Fibertite membrane as follows:-

### 40 year in service history

As noted above roofs installed in 1979 are still performing and providing effective roof top protection in a wide range of environments.

### No product reformulation in 36 years.

Fibertite is the only roofing membrane that has not been reformulated. That's because they got it right first time with the highest quality polymerisation. The only change that has been made is that a wider range of thicknesses, re-reinforcement packages and colours are now available.

### Limitations in Performance.

Fibertite has fewer limitations than any other membrane. For example, chemical exposure and ponding water have no effect on the membrane and will not create a warranty exclusion.

### Performance in the harshest environments.

For 40 years Fibertite has been tested in the harshest environments and has not failed. No membrane performs better than Fibertite in:-

- High wind zones.
- High UV zones. Fibertite is the membrane of choice in areas of the U.S. with the highest UV levels, eg. Colorado City (height above sea level), Arizona, Nevada (extreme heat, sunshine hours.)
- Areas of chemical exposure. Fibertite is resistant to a wide range of chemicals that are commonly found on roof tops (compressor oils, hydrocarbons, extracted animal fats.)



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## COMPLIANCE

To be compliant with the New Zealand Building Code a waterproofing membrane must meet the durability requirements as stated in Clause B2 – Durability. To meet the durability requirements of the NZ Building Code a roofing membrane must be assessed as having inservice performance of 15 years.

Verification Method B2/VM1.

### 1.0 Durability Evaluation

Verification that the durability of a building element complies with the NZBC B2.3.1 and B2.3.2 will be proof of performance and shall take into account the expected in-service exposure conditions by one or more of the following:-

- a. In-service history.
- b. Laboratory testing.
- c. Comparable performance of similar building elements.

The only true test of a roofing membrane is TIME. Or, to state the code, “in-service history.”The code states that when assessing in-service history consideration should be given to length of service, environment of use, limitations in performance and changes in formulation.

The in-service history of the Fibertite membrane demonstrates that it exceeds the durability requirements of the NZ Building Code.

When BRANZ issued its appraisal of the Fibertite membrane it assessed and stated its durability at 25 years. This is the only single ply membrane that BRANZ has appraised where they have stated anything other than the minimum 15 year durability. This was done based on the in-service history of the product and the provision of physical samples up to 35 years old that had been cut from actual roofs throughout the United States and supplied by Fibertite to BRANZ.

The comment has been made that much of the performance history of Fibertite is from the United States and their climate and conditions vary to New Zealand. The reality is that almost all our roofing membranes are imported and are derived from either Europe or the United States. In terms of the range and intensity of climate (temperature extremes, sunlight hours, wind events etc) the United States represents a more rigorous testing ground for a roofing membrane than Europe and overall climatic conditions at least as harsh as New Zealand.

## WHAT IS DU PONT ELVALOY KEE?

Fundamental to the performance of Fibertite is the polymer that is used to create a flexible thermoplastic sheet membrane. KEE is a solid, high molecular weight polymer and due to its high molecular weight it does not migrate out of the sheet over time. Other thermoplastic sheet membranes use liquid or powdered polymers that have a low molecular weight and as such are prone to migrating out of the sheet over time. The common term for this is plasticiser migration. As the low molecular weight polymer migrates out of the sheet, the sheet becomes brittle and is prone to cracking and seam failure. The higher the UV the more prone low molecular weight polymers are to migrating out of the product.

Because the Fibertite membrane is so stable it is permanently able to welded. If a new penetration needs to be installed in a 25 year old membrane a new Fibertite detail can simply be welded to the aged product.

## SEAM STRENGTH AND WELDABILITY

One of the most critical factors in the performance of a roofing membrane is the strength of the welded seams and integrity of welded details. Premature membrane failure of bitumen membranes and butyl membranes is common at the sheet joints of the membrane. Fibertite membrane has greater seam strength than any other roofing membrane – this includes other thermoplastic single ply membranes, butyl/EPDM membranes and bitumen membranes.

Seam strength is also retained for the life of the membrane. A correctly executed weld will not fail for the life of the membrane. With Fibertite membrane all welds and details can be verified as secure as part of our QA procedures. It is not possible to probe and verify other membranes to establish lap security. For example it is not possible to probe and verify a lap in a bitumen membrane. Seams are not effected by ponding water or by chemical exposure. Seams are welded robotically at high temperature (600 degrees) to establish a positive and consistent weld. Because of the polymerisation of other thermoplastic membranes they have to be welded at much lower temperatures and have a narrower weld window resulting in greater risk of seam failure.



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## PUNCTURE RESISTANCE OF MEMBRANE

The Fibertite membrane has extremely high puncture resistance. Fibertite are the only membrane manufacturer who design and manufacture their own re-enforcement package to provide industry leading puncture resistance.

Although bitumen membrane systems can be up to 6 times thicker than a Fibertite membrane, Fibertite has 5 times the puncture resistance of a standard torch-on product.

## COMPARISON WITH OTHER MEMBRANES

There are a range of other membrane options in the market place. Broadly these can be categorised as modified bitumen membranes (often referred to as torch-on), rubber based membranes (butyl and EPDM), TPO membranes (a low cost thermoplastic membrane), and standard PVC membranes (modified with liquid plasticisers.)

These alternative membrane solutions have a number of limitations when compared to Fibertite which we have briefly summarised below:-

A. MODIFIED BITUMEN (TORCH-ON) MEMBRANES	B. TPO MEMBRANES
<ul style="list-style-type: none"><li>• Require redundancy of two layers to provide satisfactory performance, increasing installation time and cost and opportunity for installation error and seam failure.</li><li>• Small roll dimensions (8m x 1m) means large number of side and end lap welds.</li><li>• Product thickness makes overlaps and details bulky resulting in restricted water flow and making a breach more likely.</li><li>• Requires gas flame increasing construction risk.</li><li>• Most chemicals, greases, fats etc are detrimental to performance of modified bitumen membranes and will void warranty.</li><li>• In higher temperatures will become soft and prone to damage.</li></ul>	<ul style="list-style-type: none"><li>• In-service history is short and documented failure rate is high.</li><li>• TPO introduced to market in 1990's and subsequently re-formulated three or four times = experimental membrane.</li><li>• Poor puncture resistance due to weak/low-cost re-enforcement scrim.</li><li>• Poor chemical resistance.</li><li>• Moderate seam strength.</li></ul>
C. BUTYL RUBBER MEMBRANES.	D. PVC MEMBRANE
<ul style="list-style-type: none"><li>• Require mechanical seal at laps that utilises tape and glue, this becomes the weak link.</li><li>• Seam failure accelerated if subject to ponding water.</li><li>• Poor chemical resistance.</li><li>• Low light reflectivity.</li></ul>	<ul style="list-style-type: none"><li>• Rely on high levels of liquid plasticiser for flexibility of membrane. Plasticiser migration, particularly in high UV, causes membrane to become brittle and more susceptible to thermal shock, foot traffic and seam failure.</li></ul>

## SUMMARY

We have now been involved in numerous installations of the Fibertite membrane throughout New Zealand. What stands out with Fibertite is the strength and verifiability of the welds and the ability to execute even the most complex details with absolute certainty as to waterproof integrity.

By any measure – durability, longevity, chemical resistance, puncture resistance, seam strength, wind uplift resistance – Fibertite membrane is the world's best roofing membrane.



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