SEAL OF APPROVAL:

MEETING ENERGY EFFICIENCY TARGETS WITH HIGH PERFORMANCE WEATHER SEALS

IMPROVES ENERGY EFFICIENCY IN YOUR HOME

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VEET State Government Victoria

INTRODUCTION

As the negative impact of human action on the environment becomes increasingly evident, there is a growing demand for sustainability across all industries. This is particularly the case for the design and construction sector. According to the 2017 article in *Procedia Engineering*, "The Carbon Footprint of Australia's Construction Sector", the construction industry is among the largest emitting sectors in the country when direct and embodied emissions are factored together.[1] Furthermore, research from the University of Wellington highlighted that the construction, operation and maintenance of buildings accounted for 25% of all Australian greenhouse gas emissions – a figure set to grow in line with the country's growing population.[2]

Against this backdrop, design and construction professionals are under increasing pressure to deliver buildings and spaces that not only meet demanding functionality and aesthetic requirements, but also requirements with regard to sustainability and energy efficiency. Bolstered by consumer demand, schemes such as the Victorian Energy Upgrades (VEU) program and pioneering practitioners, the industry has taken significant steps in the right direction.

In this whitepaper, we examine the objectives of the VEU program and provide an overview of how weather seals can be used to meet its requirements. This document highlights how high quality weather sealing can deliver elevated outcomes with respect to energy efficiency and general sustainability.

UNDERSTANDING THE VICTORIAN ENERGY UPGRADES PROGRAM

Formerly known as the Victorian Energy Efficiency Target (or VEET), the VEU program is overseen by the Victorian Essential Services Commission. This program is administered in accordance with the *Victorian Energy Efficiency Target Act 2007* and its regulations, specifically:

- the *Victorian Energy Efficiency Target Regulations 2018*;
- the *Victorian Energy Upgrades Specifications 2018*; and
- the *Victorian Energy Efficiency Target (Project-Based Activities) Regulations 2017*.

The primary goal of the VEU program is to reduce greenhouse gas emissions by increasing access to discounted energy-efficient products and services.[3] The program also incentivises energy efficiency upgrades; encourages investment, employment and innovation in industries creating energy-efficient products and services; and develops technology in Victoria.

In 2018, the Department of Environment, Land, Water and Planning reviewed the original *Victorian Energy Efficiency Target Regulations 2008*, which established the scheme, and released the new 2018 Regulations. The *Victorian Energy Efficiency Target Regulations 2018* provide for deemed activities in the VEU program.

Under the VEU program, large energy retailers are required to submit a specified number of Victorian Energy Efficiency Certificates (VEECs) annually. VEECs are electronic certificates which are created when certain energy efficiency activities are undertaken in residential or non-residential premises.[4] Certificates can be sold to energy retailers who are liable under the program to surrender a certain number of certificates every year.[5] These VEECs indicate participation in a range of energy saving activities prescribed under the program, with each certificate representing one tonne of greenhouse gas emissions reduced by the undertaking of an activity.

Part 15 of Schedule 2 in the *Victorian Energy Efficiency Target Regulations 2018* details specific requirements for weather sealing. Table 15.1 in the Regulations provides a list of acceptable "weather sealing activities" that contribute to the obtaining of a VEEC. Table 15.2 goes on to outline the acceptable categories of weather sealing products.

> "Effective weather sealing results in enhanced thermal comfort,which can have a positive impact on the health and wellbeing of occupants."

WEATHER SEALS: A DESIGN SOLUTION FOR SUSTAINABILITY

A weather seal (also known as a "weather strip") is a component used to seal gaps around moveable building components such as doors and windows to prevent air leaks.[6] Weather seals can be fabricated from a range of materials such as tape, foam, felt, rubber/vinyl and silicone.

Each type of seal has distinct properties and is best suited for specific applications. When specifying weather seals, the friction, weather, temperature changes, and wear and tear associated with the intended application needs to be considered. For example, silicone is often used in stationary components such as inoperable windows, whereas felt should not be used in locations that are prone to high moisture exposure as it will decay.[7] Reinforced foam scores well on wind tests, while tape is easy to install but offers only low durability so should only be used in areas where little wear is expected.[8]

KEY BENEFITS OF WEATHER SEALS

Energy Efficiency
High quality weather sealing from a reputable manufacturer provides an effective infiltration barrier against leakage of conditioned air from inside the building as well as preventing external air, draughts and rain from entering an interior space. Windows, doors and vents that do not seal tightly make indoor temperature regulation difficult to control resulting in increased energy consumption to keep occupants comfortable. According to the YourHome government website, air leakage accounts for 15–25% of winter heat loss in buildings and can also result in loss of coolness in climates where air conditioners are used.[9]

By directly addressing air leakage, weather seals can significantly enhance occupant thermal comfort, improve energy efficiency in homes and reduce utility bills. When combined with effective insulation, air sealing can save homeowners an average of 15% on their heating and cooling costs, which represents approximately 11% of their total energy costs.[10] In recognition of the environmental, performance and economic benefits of weather seals, the *Victorian Energy Efficiency Target Regulations 2018* mandates that all windows and external doors be weather sealed.

Overall Sustainability and Reduced Carbon Emissions
As the global concern for climate change intensifies, high carbon emissions are a particular concern for many designers, specifiers and homeowners. Australian homes generate one-fifth of the country's greenhouse gases, a figure amounting to approximately 18 tonnes per household each year.[11] In January 2019, ABC News described air conditioners as the appliance that consumes the most electricity in the average Australian home, and also noted that most units rely on refrigerants derived from greenhouse gases.[12] Hydrofluorocarbons (generally referred to as HFCs), the greenhouse gas commonly associated with air conditioners,[13] are especially problematic than other greenhouse gases as they trap thousands of times as much heat in the atmosphere as carbon dioxide.[14]

On a global scale, research indicates that air conditioners are set to account for over 130 gigatons of CO2 emissions between 2019 and 2050.[15] This amounts to 20-40% of the remaining global "carbon budget", which represents the most that can be emitted while keeping global warming to less than 2˚C above pre-industrial levels.[16] Effective weather sealing can reduce reliance on carbon-emitting air conditioning and mitigate these current trends. This can result in significantly lower levels of carbon and greenhouse gas emissions on both a local and global level.

Other Benefits
Weather sealing can also prevent problems related to excess moisture and condensation within an interior space. This moisture and condensation can cause structural damage in buildings and lead to mould development along with its associated health risks.[17] Other potential issues include glass failures and breaking on windows and damage to interior finishes and coatings.[18] Moisture penetration can also dampen insulation reducing its effectiveness and amplifying any existing difficulties with indoor temperature regulation in residential and non-residential buildings.[19]

Effective weather sealing results in enhanced thermal comfort, which can have a positive impact on the health and wellbeing of occupants. In a commercial context, this is critical given the demonstrated link between thermal comfort and worker performance. SafeWork NSW reports that thermal discomfort can cause fatigue, reductions in concentration and productivity, and elevated rates of absenteeism.[20] Weather sealing and other insulation measures can curb, and in some cases eliminate entirely, the effects of thermal discomfort.

COWDROY

For over a century, Cowdroy has been a pioneer within the Australian hardware industry. With a genuine commitment to innovation, the company has become the leading manufacturer of track and seal products for residential and commercial installations. Cowdroy products are available in Australia, New Zealand, Malaysia, across the rest of Asia Pacific and North America.

Driven by strong internal design, research and development capabilities, Cowdroy provides the local market with high performance products that meet the needs of contemporary construction. Among these needs is the growing global demand for sustainability within buildings and interior spaces.

Cowdroy supplies a range of products, including weather seals, that directly address sustainability issues and enable elevated levels of energy efficiency. These products promote a reduced reliance on carbon-emitting modes of artificial heating and cooling.

CM3 Automatic Door Seal

One of Cowdroy's leading designs, the CM3 Automatic Door Seal is an extruded aluminium door seal which fits to the bottom of doors. Suitable for single hinged doors that are inward opening, this solution comes with a rubber insert in a spring-loaded extrusion and automatically lifts and drops the seal as the door is opened and closed.

This solution seals against problems such as light, sound, dust, draughts, wind, rain, insects and rodents. By reducing temperature loss, this high quality door seal increases the energy efficiency of homes and reduces energy bills. It is also quick and easy to install, providing designer, specifiers and homeowners an affordable and effective solution for improving the sustainability of residential and non-residential buildings.

The CM3 Automatic Door Seal covers gaps up to 16mm and comes in 915mm and 1220mm lengths. It is also available in bronze anodised, clear anodised and gold anodised options.

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