COATINGS FOR CLADDINGS

Even the best designed and constructed buildings will degrade if the appropriate coatings are not applied and then maintained in a timely manner, especially in our demanding environment.

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Cladding preferences have changed significantly over the past 10–20 years. In 1990 wood, brick and stucco accounted for 95% of residential cladding materials in the United States, but by 2000 fibre-cement, vinyl and aluminum cladding had grown and accounted for 44%.

In New Zealand the increasing popularity of monolithic cladding systems and Mediterranean-style designs without rain protection features such as eaves, and mechanical flashing around windows and doors, led to many houses being affected by the leaky building syndrome.

Sound building plus quality coating

The first defences to prevent water getting into a building are good construction practices and correct detailing for the risk. This includes proper sealing of joints and openings, flashings and not compromising the strength and integrity of building components.

A quality paint job is then required using appropriate high quality coatings, otherwise the performance of a soundly constructed building can be degraded.

Quality exterior paint jobs on new construction use an appropriate primer and quality paint, each applied at a suitable coverage rate. Two coats of paint will ensure coverage of any pinholes and thin areas where water might penetrate. Elastomeric wall coatings are an option for surfaces where cracks exist or are likely to form later, but should not be relied on to compensate for poor construction practices.

Demanding environment

New Zealand's environmental conditions are demanding for coatings, particularly the high ultraviolet (UV) irradiation, extensive coastal exposure and the potential for building movement caused by earthquakes, wind and temperature extremes. The possibility of more frequent severe weather will increase these demands.

Trying to reduce painting costs can produce short-term decorative effects at the expense of long-term protection. The best response to these demands on coatings for claddings is improvement in coatings raw material use and improved heat management.

Pigments can limit or increase heat

For a long time coloured pigments have been used to decorate claddings. Some, such as titanium dioxide, impart visual colour (white) and provide effective scattering of incident infrared radiation. Others, particularly carbon black, are strong absorbers of infrared radiation, leading to significant absorption of heat.

Many colours can be produced with low infrared absorption pigments that reduce a building's heat management requirements. Such pigments are particularly useful in hot climates as they result in cooler indoor temperatures and, if the building is air conditioned, lower cooling costs. These pigments are used in roofing but are not yet widely offered as colouring options for other claddings. It is typically cheaper to colour coatings with conventional pigments.

Research into the efficient use of pigments to produce their full potential of opacity and colour has led to improvements in: pigments and binder chemistry; opaque polymers; durability and barrier properties; and binders designed to improve the spacing of pigments.

These technical advantages allow coatings manufacturers to formulate better coatings and more efficiently use raw materials (pigment and binder polymer).

Pigment spacing

Better pigment spacing provides a number of benefits in a coating. UV radiation is more effectively scattered at the coating surface. This means that less UV radiation penetrates deep into the coating with the result of improved protection of the underlying polymer.

Opacity to visible light is maximised, resulting in the best use of titanium dioxide and coloured pigments.

Barrier properties are improved so that coatings have reduced permeability to electrolytes such as salt.

There is a corresponding improvement in binding capacity, as measured by scrub resistance and exterior durability for a given pigment volume concentration (PVC), or the potential to formulate coatings to higher PVC.

Maintenance maximises performance

Identification of suitable coatings for claddings, including features such as those described above, can be difficult. This can be partly due to insufficient communication of information describing Building Code requirements and coating performance. Consumers may form expectations of coating performance which exceed Code requirements but which are not attainable from the actual substrate and its preparation.

A key performance issue with all coatings is their maintenance requirements. These are particularly important in New Zealand's climate. Performing appropriate and timely maintenance such as cleaning, repair of damage and periodic repainting will greatly enhance the ability of a coating system to reach or exceed its design life. Consumers need to be made aware of these maintenance requirements.

Communication plays a major role in building confidence, specifying the correct coating, appropriate substrate preparation, effective maintenance and realistic expectations of performance.