

# Designing School Shade Systems That Work All Year Round

*This resource has been produced by Archgola New Zealand  
All information included has been sourced from  
The Cancer Society of New Zealand*

**Are you protecting your students from the dangers of  
ultra violet radiation?**

**Are you providing shelters that meet the climate  
conditions of your area in both summer and winter?**

“Research confirms that clothing, hats and sunscreen are not 100% effective because of the inadequacies in the shading of hats and clothing, and in applying sunscreen. Shade can compensate, and can also make more comfortable environments in creating shelter, reducing glare and / or providing relief from the heat of the sun” (New Zealand Cancer Society)

“During the Cooler months (May through August) when Ultra Violet Radiation levels are low, the main consideration is to provide outdoor spaces that are warm, light and protected from the wind” (Under Cover- New Zealand Cancer Society)



## Is skin cancer a real risk to your students?

**Skin Cancer is a major health problem in New Zealand. It is the most common form of cancer in this country, with about 20000 people developing new skin cancers each year. Melanoma rates are amongst the highest in the world and about 200 New Zealanders die from Melanoma each year.**

### Why?

- The intense ultraviolet radiation that characterises the New Zealand Environment.
- Large proportion of fair- skinned population.
- The outdoor nature of daily life in New Zealand.
- Social values which support the belief that a sun tan is healthy and attractive.

Over the last 2 decades education campaigns have resulted in the adoption of personal sun protective behaviours. A comprehensive approach to sun protection however includes another vital component. This is the provision and use of the U.V protective shade.

Many schools and kindergartens in New Zealand lack adequate shade. Shade is necessary at outdoor spaces if activities take place there on a regular basis during times of high U.V levels. It is important that efforts to provide shade are as effective as possible.



## Is your school / kindergarten in a danger zone?

Where you *are* in New Zealand determines *how much risk your students are in* during different times of the year.

The most intense U.V is received when the sun is highest in the sky. In New Zealand this occurs at about 1:30pm day light saving time. About 50% of the daily total of Solar U.V Radiation is received within 2 hours either side of the sun at its highest point.

The following table demonstrates typical U.V index values near midday for clear skies over New Zealand.

	U.V index				Key		
	21 Dec	21 Mar	21 Jun	21 Sep	UV Index	Risk Description	Burn Time
Kaitaia	12.7	8.1	2.2	6.9	0	no danger	-
Auckland	12.3	7.5	1.7	6.1	1-2	Minimal	<72 minutes
New Plymouth	11.8	6.8	1.4	6.4	3-4	Low	<36 minutes
Wellington	11.2	6.3	1.1	5	5-6	Moderate	<24 minutes
Christchurch	10.4	5.6	.9	4.4	7-9	High	<16 minutes
Dunedin	10	4.9	.6	4	10-11	Very high	<13 minutes
Invercargill	9.9	4.8	.6	3.8	12-14	Extreme	<10 minutes

## How does U.V radiation injure?

The 2 main organs affected by U.V Radiation exposure are the skin and the eyes.

### The Skin

- Sunburn
- Skin Ageing
- Skin Cancer-
  1. Melanoma-in 1996 it was the cause of nearly 200 deaths in New Zealand.
  2. Basal Cell Carcinoma (BCC) and Squamous Cell Carcinoma (SCC) - in 1996 there were 60 deaths from BCC and SCC

### Eye Damage

- Painful eye inflammation for example snow blindness
- A growth over the cornea
- Cloudiness of the lens
- Cancer on the surface of the eye



## **Is Direct U.V the only danger to your students?**

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**There are 2 types of U. V, direct and indirect. Indirect U.V is radiation that has been reflected by surfaces such as snow or walls or scattered by water droplets in clouds.**

**There are some circumstances when indirect U.V can account for more than half of the total incidence of Ultra Violet radiation.**

In schools the biggest concern from indirect U.V is from concrete paths and courts, (between 8.2-12% reflectance) and asphalt surfaces (4.1-8.9%). Fields offer a low reflectance (2-5%).

## **Is your shade structure going to work?**

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**The main objective of shade planning is to provide shade at the right place, at the right time of the day, at the right time of the year.**

**Unfortunately the location of shade structures and trees often produces a shadow pattern entirely different from that anticipated.**

When considering your plan you need to create outdoor spaces that protect from both direct and indirect U.V. For example, you need to place shade barriers above and to the side of a designated area. This is so as to reduce the reflection of U.V from nearby surfaces in the designated area and increase the size of the shaded area to allow people to use the centre of the area rather than the edges.

**Remember, good quality shade should...**

- Provide at least 94% protection from direct U.V radiation
- Create an environment that is comfortable to use in both winter and summer

**Summer protective shade** - The high UVR levels experienced throughout New Zealand in summer means that the provision of shade during these months should be a priority. Summer shade provision should minimize U.V levels as well as heat and light. The aim is to create an environment which is shaded and cool.

**Winter protective shade** - U.V levels are low between May and July, so the main consideration is allowing for transmission of sufficient heat and light. As shade structures are likely to be used year round, the aim is to create an environment that provides winter warmth as well as coolness and protection from U.V in the summer.



## Which shade material is best?

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When selecting materials for the primary shading element, the following issues need to be considered:

1. Suitability for the project
2. Ultraviolet protection factor
3. Desired level of light transmission
4. Desired level of solar heat gain
5. Waterproofing qualities
6. Environmental consequences
7. Wind resistance and structural implications
8. Ease of replacement
9. Maintenance requirements
10. Lifespan of U.V qualities
11. Particular properties
12. Relative cost
13. Compliance with NZ building code

## How do you measure how well a material protects your students from dangerous U.V rays?

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There are 3 ways you can measure how effective your shade selection is.

1. **UPF Range** - A scale developed in Australia to rate U.V. protection provided by materials. It is based on the % of U.V radiation transmitted through the material.
2. **U.V. R absorbed** - The % of U.V radiation absorbed / blocked by a shade material.
3. **U.V transmitted** - The % of U.V radiation that transmits through a shade material.

<i>UPF Range</i>	<i>%U.V absorbed</i>	<i>%U.V transmitted</i>	<i>protection category</i>
15-24	93.3-95.8	6.7-4.2	Good protection
25-39	95.9-97.4	4.1-2.6	Very good protection
40-50+	97.5+	<2.8	Excellent protection



## **Which areas of your facility do you need to consider?**

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### **Schools**

- Playgrounds
- Outdoor learning areas
- Canteen areas
- Pedestrian links
- Schools bus stops
- Sports fields and facilities
- Swimming pools

### **Kindergartens / preschools**

- Open areas such as sandpits and bark areas
- Quiet areas
- Transition zones
- Baby / toddler areas



## What should you do?

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As you can see, meeting the shade requirements of your establishment is a complex task. Prioritising the dangers, designing plans and policies, selecting the best shade option for your school, obtaining funding... and the list goes on.

Archgola New Zealand offers a service that makes this process a lot easier. Just follow the following steps:

1. **Planning** - By reading these resources you have already identified that your students require greater protection.
  - Establish a project team - This should involve key members of your school / kindergarten that utilise the sites involved. For example, it might include a member of your P.E department, a member of your board / committee, a student elect and your property manager.
2. **Conduct a Shade audit** - A Shade audit will determine the adequacy of existing shade and whether there is a need for more shade. An accurate **assessment of need** undertaken early in the project will help to achieve the shade that is appropriately located, of appropriate size and cost effective.
  - Archgola NZ offers a professional shade audit service
3. **Prepare a design brief** - Your shade audit will form the basis of the design brief. The brief will:
  - Document the shade needs of the site so that an appropriate solution can be designed
  - Describe particular requirements of the project, such as the consideration of prevailing climatic conditions and potential for vandalism
4. **Explore potential sources of funding.**





## Your Role

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**Schools and Kindergartens play a significant role in the prevention of skin cancer.**

There are a number of reasons for this.

1. Part of the critical period for sustaining damaging levels of Solar U.V radiation exposure occurs during the school / early childhood years.
2. Students attend school / kindergarten up to 5 days per week throughout the year often during high U.V risk period of each day.
3. Students / children often spend a significant amount of time outdoors.

**Schools and Kindergartens have a duty to provide a safe environment for children, students and staff.**

**The New Zealand climate is temperate. Recent research has shown that 69% of the time when U.V protection is required the air temperature alone was too cool for comfort. People desired to be in the sun. The easiest way to provide U.V protection and warmth is to use a transparent material (polycarbonate and laminated glass).**