

- DRAFT -

Guidelines for operators of ultraviolet (UV) tanning lamps

2013 edition

This document has been prepared for the Ministry of Health as a replacement for the 2009 National Radiation Laboratory/Ministry of Health publication *Guidelines for operators of ultraviolet (UV) tanning lamps*.

As with the previous edition, it provides a guide for operators of commercial solaria to help them comply with the provisions of Australia/New Zealand Standard AS/NZS 2635:2008 *Solaria for cosmetic purposes*. On the basis of feedback received, the content has been rearranged and more detailed explanations provided in some areas.

This version has been released in draft form to assist Public Health Units and commercial solarium operators improve compliance with the Standard, and further comments and suggestions for improvement are welcome. They should be sent to:

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A pdf version of this publication is available at: www.emfservices.co.nz/resources/uv-and-sunbeds

This page contains links to other resources on the internet which could be of interest.

Guidelines for operators of ultra-violet (UV) tanning lamps

This guide has been written for the operators* of solarium (ultraviolet tanning lamps) to help them comply with the provisions of Australia/New Zealand Standard AS/NZS 2635:2008 *Solarium for cosmetic purposes*. The objective of the Standard (1.2)[†] is to “provide operators and users of artificial tanning equipment with procedures for reducing the risk associated with indoor tanning.” Surveys of commercial solarium operators have repeatedly shown that most of them do not comply with key safety provisions of the Standard. If questions are ever raised about whether a solarium has been operated so as to minimise risks to clients, it is likely that this Standard would be used as a yardstick for comparison. This guide is not a substitute for the Standard, which must be referred to as well. All commercial tanning operations should have a copy of the Standard available[‡].

Overexposure to tanning lamps can cause severe burns. Over time, exposure to ultraviolet radiation from any source (the sun or tanning lamps) increases the risk of skin cancer, and causes premature aging of the skin (thickening, loss of elasticity, wrinkling etc) and eye damage. Because of this, some countries have banned commercial sunbeds altogether. Others, including New Zealand, regulate sunbeds or have announced their intention to regulate them.

Choosing to operate a commercial sunbed is not a decision that should be taken lightly. Incorrect operation can have serious short and long term health consequences for users. All staff involved with operating commercial sunbeds must be properly trained.

Following these Guidelines does not eliminate any risks, it only reduces them. Solarium operators should not claim that sunbeds are risk free, or make claims of non-cosmetic health benefits (2.12).

Content of these Guidelines

- Section 1 of these Guidelines is about day to day operation, and covers administrative and procedural matters.
- Section 2 covers the development of a tanning plan for each client.
- Section 3 discusses technical requirements for sunbeds and their installation.

Appendices provide background information on the effects of UV radiation, reference material and examples.

All operators should be able to comply with the Standard’s administrative and procedural requirements. Depending on the information provided by the equipment supplier, compliance with the technical requirements may be more difficult.

Some operators have difficulty understanding the more technical requirements of the Standard. If that is the case, they should ask themselves whether they should continue offering commercial sunbed services.

* The operator is the person who controls the sunbed. These guidelines assume that the operator is not the same person as the solarium user or client who is exposed to the UV. Nevertheless, the same principles apply for home users.

[†] Throughout these guidelines, numbers in brackets refer to clauses in the Standard.

[‡] The Standard is available from Standards New Zealand www.standards.co.nz

Section 1 Day to day operation

This section covers procedural and administrative requirements of the Standard.

1.1 Staff training

All staff who operate the equipment and work with clients must receive proper training. This should include all the material covered in this Guide and in the Standard (2.11). It is a good idea to keep records of staff training.

A fully trained staff member should be on duty and supervising operation of the sunbeds whenever they are used (3.4).

1.2 Warning notices

Warning notices, at least A4 in size, must be posted near the entrance or reception area of the solarium and by every tanning unit (3.6.1). An example which meets the requirements of the Standard is provided in Appendix A.

1.3 Client interview and assessment (3.6.2)

Before being accepting someone as a client, you should interview them. The purpose of the interview is to screen out people who are most sensitive to the effects of UV. People may be sensitive to the effects of UV because of:

- Their age
- Skin type
- Medications
- Pregnancy

Dermatologists use a “skin type” classification, based on physical characteristics and past experience of tanning, to assess sensitivity. The skin type is given a number (normally shown in roman numerals) from I to VI. A simple outline of the scheme is shown in Appendix B. Each client’s skin type should be assessed and recorded. If in doubt, use a lower value.

An example interview form is shown in Appendix C. Using a form like this will enable you to determine a client’s skin type, and other factors that might make them particularly sensitive to UV.

You should refuse to accept clients who are

- Under 18 (2.5)
- Who have skin type I (3.1.3)

You should strongly discourage clients who

- Have skin type II (3.1.3)
- Have been treated for skin cancer
- Have a large number of moles or freckles
- Have a history of frequent sunburn in childhood
- Have ever suffered from allergic reactions (eg itching, inflammation) when exposed to UV or light.
- Are pregnant (skin may be more sensitive during pregnancy, and UV may break down folic acid which is important for fetal development).

Clients who are on medications (by mouth or applied to the skin) should be advised to check with their doctor or pharmacists whether they may suffer side-effects. Some medications, such as antibiotics and anti-inflammatories, may make people abnormally sensitive.

1.4 Consent form (3.6.2)

Each client should read and sign a consent form of the type shown in the Standard before their first session. (The example in the Standard is not subject to copyright; an alternative is shown in Appendix D.) A copy should be provided to the client. You should store your copy for at least two years.

1.5 Client records (3.5)

You should keep copies of the:

- Signed consent form
- Initial interview and skin type assessment
- Tanning plan adopted
- Records of dates, times of day, and durations of tanning sessions and, if there are several tanning units, the unit used

for at least two years. Remember that this information is personal and should be kept confidential. An example of a form which could be used to record details of sessions is in Appendix E.

1.6 Eye protection (3.2)

All clients must wear eye protection which meets the requirements of the Standard. Some users are reluctant to protect their eyes because of untanned shadows. Eye protection is important and must be worn. Even if the eyes are closed, some UV can pass through the eyelid and the lens is particularly susceptible to long term damage. Sunglasses are not adequate because rays can enter from the sides and some sunglass lens materials give little protection – the Standard requires that eye protection forms a tight seal around the eye.

1.7 Repeat sessions

You should allow at least 48 hours between sessions (3.1.2). (This also means that the first session should not occur less than 48 hours after using a sunbed elsewhere, or if the client has been sunbathing.)

Once the session has finished, advise the client to:

- Avoid sunbathing or spending long periods outdoors during daylight for at least 48 hours
- Report any unwanted skin reaction, including reddening, at the next session.

Immediately before the next tanning session:

- Check that at least 48 hours have elapsed since the previous session or any deliberate sunbathing
- Ask the client if their skin reacted after the previous session
- Check for signs of ill-effects.

Reduce the duration of the next session if there is more than a slight reddening of skin.

If there is any burning, discoloration, irritation, blistering, or swelling, give no further exposures until the client has sought advice from a doctor.

Record these results and any advice on the client's file, along with details of the day's session.

1.8 Hygiene (3.3)

You should ensure that parts of the tanning equipment which might come into contact with the user are either discarded (if disposable) or disinfected before being used again. This includes the protective goggles (3.3).

1.9 Protection of staff

If you or your staff need to work near a unit while it is operating (eg to check whether lamps are working), minimise exposure by:

- Keeping as far away as possible
- Avoiding direct or reflected rays from the lamps, whenever practicable
- Wearing clothing which covers as much skin as possible (eg long sleeves)
- Wearing eye protection.

Virtually all non-transparent materials will stop UV. Ordinary glass and clear plastics do not give protection from UV-A wavelengths*.

* See Appendix F for information on UV wavelengths and the distinction between UV-A, UV-B and UV-C.

2 Tanning plans

A tanning plan should be drawn up for each client, based on their skin type. Time spent on the sunbed should be increased gradually over the first few sessions. There should be at least 48 hours between sessions, and normally no more than three sessions per week.

The sunbed manufacturer may have supplied charts or tables detailing how long people with different skin types should stay on the sunbed, and how the session times should be built up over the first few sessions. If you have no other means available to determine session times, then you should use these. However, you should bear in mind that:

- These charts are only valid for the sunbed with which they were supplied
- Different types of lamp are available, with different outputs and producing different qualities of UV light. If you change any of the lamps in a sunbed, you *must* replace them with exactly the same type of lamp.

The tanning plan must always limit the UV “dose” in any session to be a little below the dose required to produce the first signs of sunburn. As mentioned above, in the initial sessions the dose should be lower still.

2.1 Measuring the UV dose

The UV dose received on a sunbed depends on two factors:

- How much UV radiation is produced by the lamps
- How long the client spends on the sunbed.

The effectiveness of UV lamps in tanning or causing sunburn (measured where the client would be on the sunbed) is called the *Effective UV Irradiance*, abbreviated to UVR_{eff} . This takes account of the intensity of the UV lamps in the sunbed (how bright they are) and also the spectrum of UV light which they produce. As described in more detail in Appendix F, some wavelengths* of UV light are much more effective than others at producing both the desired effect (a tan) and also undesirable effects (burning, skin cancer and other skin damage).

The UV dose can be calculated from:

$$\text{UV dose} = UVR_{eff} \times \text{time exposed to the lamps (measured in seconds)}$$

As discussed in Section 3, the Standard requires that UVR_{eff} from a sunbed be no more than 3 times that from the sun at mid-day in summer[†].

The UV dose tells us how much effective UV energy reaches every square metre of the client’s skin. It is measured in units of Joules per square metre (J/m^2).

2.2 Maximum UV dose allowed

The UV dose at which the skin might just start to redden – the first stage of sunburn – is called the *Minimum Erythema Dose* or *MED*. (“Erythema” comes from the Greek word for “red”.) The MED depends on skin type:

* If we could see UV, the “wavelength” would be like its colour. Visible light has a range of wavelengths, and the colour we perceive depends on the wavelength.

[†] Put another way, the sunbed can have a UV Index of up to 36. That is why great care must be taken to prevent overexposure, which can easily cause sunburn and increase the risk of long term effects.

Skin type	MED (J/m ²)
II	250
III	350
IV, V, VI	450

These values are also shown in the table at the bottom left of the interview record in Appendix C.

The Standard specifies that:

- At the initial session, the UV dose should be no more than 0.5 (ie half) of an MED (3.1.1)
- The UV dose in any session should never exceed 0.9 (ie nine tenths) of an MED (3.1.2)
- The total UV exposure in any week should be less than 3 MED (3.1.2). (This effectively limits the number of sessions to three per week, except in the initial stages).

These requirements are summarised in the table below.

Skin type	MED (J/m ²)	Maximum UV dose (J/m ²)	
		In first session	In any session
II	250	125	225
III	350	175	315
IV, V, VI	450	225	405

2.3 Development of a tanning plan

It is recommended that you build up to the maximum exposure time over several sessions, carefully monitoring the results and adjusting session times cautiously so as not to cause any reddening.

The key is to determine the time of each session. To do this, you need to know:

- The UV dose allowed
- The effective UV irradiance of the lamps UVR_{eff} .

Section 2.1 showed that the UV dose can be calculated from:

$$\text{UV dose} = UVR_{eff} \times \text{time exposed to the lamps (measured in seconds)}$$

If you wish to calculate the time for a session, this must be rearranged:

$$\text{Maximum time exposed to the lamps (seconds)} = \frac{\text{Maximum UV dose}}{UVR_{eff}}$$

Example

Suppose you have:

- A client with skin type III, for which the MED is 350 J/m²
- A sunbed with UVR_{eff} of 0.6 W/m².

Time allowed on the sunbed for the first session

From the table at the end of section 2.2, the maximum dose for the **first** session is 175 J/m². So the maximum time exposed to the lamps (session time) is:

$$\begin{aligned}\text{Maximum time exposed to the lamps (seconds)} &= \frac{175}{0.6} \\ &= 292 \text{ seconds (4 minutes 52 seconds)}\end{aligned}$$

Maximum time allowed on the sunbed for any session

From the table at the end of section 2.2, the maximum dose for **any** session is 315 J/m². So the maximum time exposed to the lamps (session time) is:

$$\begin{aligned}\text{Maximum time exposed to the lamps (seconds)} &= \frac{315}{0.6} \\ &= 525 \text{ seconds (8 minutes 45 seconds)}\end{aligned}$$

So for this client, you would start with a session time of 4 minutes 52 seconds (or as close to this as the tanning bed timer allows – if in doubt, round the times down to the nearest minute or half minute), and build up the time over, say, the next four sessions to a maximum of 8 minutes 45 seconds.

2.4 The practicalities of tanning plans

2.4.1 How do I find out the value of UVR_{eff} for my sunbed?

UVR_{eff} is not easy to measure, nor is there any well defined procedure for making the measurement. The supplier or manufacturer of the sunbed ought to be able to tell you.

2.4.2 I don't know UVR_{eff} for my sunbed, what should I do instead?

If you cannot find the value of UVR_{eff} for your sunbed, then you will have to rely on charts and tables of tanning times provided by the manufacturer or supplier.

2.4.3 Do I have to go through all those calculations for every client?

You only need to do the calculations once, for each skin type. Then you can prepare a table of exposure times (2.2.1). This would need to be done for each sunbed. There is a worked example in Appendix G.

2.4.4 This seems very complicated, do I have to do it?

Giving your clients the correct UV dose is one of the most important ways to reduce the risks of sunbed use, so it must be done properly. At the moment, you probably rely on tables provided by the sunbed manufacturer or supplier, but after maintenance (eg replacing tubes) you should really check the lamp output and the session times.

If you find this part of the Standard difficult to understand, then you should ask yourself whether you ought to be offering services which, if performed incorrectly, can have serious health consequences.

3 Installation and maintenance

3.1 Choice of sunbed

Each tanning unit must have

- An accurate graduated timer, accurate to within 5%, which turns off power to the lamps after a pre-set period. Only the operator (ie not the client) should determine and set the exposure time (2.2.3, 2.2.1).
- A means by which the client (from the tanning unit) and the operator (from a central control area) can easily stop the session at any time (2.2.2). A provision to continue the session (up to the original preset time) may also be installed (2.2.4).
- Grilles or guards or some other means which prevent the user from accidentally touching or coming too close to the lamps (2.3.1).
- If the user stands in the unit, it must have a handgrip or other means to provide support (2.7).
- Several lamps spaced to provide practically even distribution of UV rays over the body.
- The lamps must comply with the specification in IEC 61228 (2.9).
- There should be no detectable UV at wavelengths below 280 nm (2.1.2). Emissions in the UV-B range (280 – 320 nm) should be between 0.7% and 3% of the total UV output (2.1.3).

The tanning unit supplier should be able to provide written confirmation that a unit meets these requirements.

3.2 Installation

Choose a secluded area, or preferably individual rooms, to set up the tanning unit, so that no one else is inadvertently exposed to UV from the unit (2.3.2). Only one person at a time should be able to be in the unit (2.4).

Ensure privacy and security is available for the client both when using the unit and dressing/undressing.

Each unit should be on its own circuit breaker (2.6).

3.3 Maintenance

It is advisable to have a tanning unit checked by a trained technician at least once per year. This should include a check of the lamp output. Results of such checks should be recorded and filed (2.1.4).

3.4 Lamp replacement

Lamps have a limited lifetime which is normally specified by the manufacturer. The operator should keep records of use to ensure that lamps are changed out as necessary. Only replace lamps with the exact equivalent. Other lamps may have different emission characteristics which could produce a completely different value of UVR_{eff} (2.8), meaning that recommended exposure times would also be different.

UVR_{eff} from the lamps should not exceed 0.9 W/m^2 (2.1.1). (This is about three times the UVR_{eff} of midday sunlight in summer – equivalent to a UV Index of 36.)

Appendix A Warning notice

WARNING

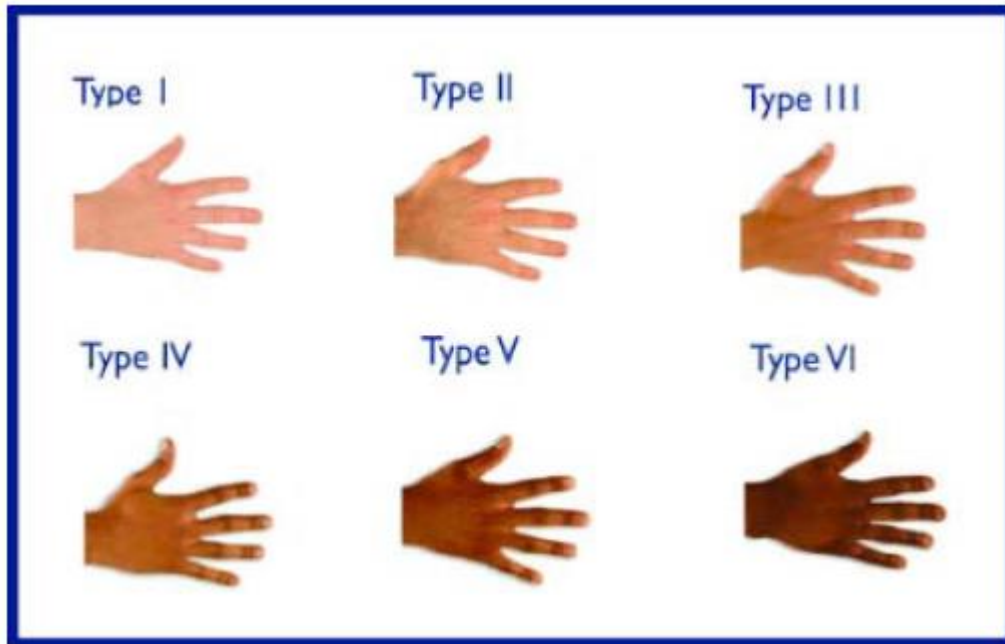
Exposure to UV radiation, such as from a sunbed, causes skin aging and increases the risk of skin cancer. Repeated exposure increases the risks.

People with fair skin who burn easily, and people under 18, will not be allowed to use a sunbed.

Avoid intentional UV exposure for at least 48 hours after using a sunbed.

Protective eyewear must be used at all times in a sunbed.

Appendix B Skin type classification



Type I

Often burns, rarely tans. Tends to have freckles, red or fair hair, blue or green eyes.

Type II

Usually burns, sometimes tans. Tends to have light hair, blue or brown eyes.

Type III

Sometimes burns, usually tans. Tends to have brown hair and eyes.

Type IV

Rarely burns, often tans. Tends to have dark brown eyes and hair.

Type V

Naturally black-brown skin. Often has dark brown eyes and hair.

Type VI

Naturally black-brown skin. Usually has black-brown eyes and hair.

Appendix C Example interview record

An example interview record is on the following page.

If the client answers Yes to any of the first six questions, they should be discouraged from using a sunbed.

To determine the skin type, each question in the skin type test should be scored and the score entered in the last column. In the first question, for example, blue eyes would score two, and in the second question, blonde hair would score 1. Add up the scores for each question to find the total score and use the table at the bottom left to determine the skin type.

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CLIENT INTERVIEW RECORD

Interview conducted on By:.....

CLIENT INFORMATION

Full Name: DOB:

Address:

..... POSTCODE:

Phone: (h)(w)(m)

Email:

HEALTH INFORMATION (PLEASE CIRCLE)

Have you previously been treated for solar keratoses or skin cancer?	Y	N
Do you have a large number of moles?	Y	N
Have you had a history of frequent childhood sunburn?	Y	N
Have you ever suffered from an abnormal reaction or allergy to light?	Y	N
Are you taking (by mouth or application to skin) any medication?	Y	N
Are you pregnant?	Y	N

If the answer to any of these questions is yes, the client should be discouraged from using a sunbed. Clients on medication, especially antibiotics and anti-inflammatories, should consult their doctor or pharmacist about your medication before using a sunbed.)

Have you used a sunbed before?	Y	N
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SKIN TYPE TEST

Score	0	1	2	3	4	Total
Genetic Predisposition						
What is the colour of your eyes?	Light Blue, Grey or Green	Blue, Grey or Green	Blue	Dark Brown	Brownish Black	
What is the natural colour of your hair?	Sandy/Red	Blonde	Chestnut/ Dark Blonde	Dark Brown	Black	
What is the colour of your skin (non-exposed areas)?	Reddish	Very Pale	Pale with Beige Tint	Light Brown	Dark Brown	
Do you have freckles on unexposed areas?	Many	Several	Few	Incidental	None	
Reaction to Sun Exposure						
What happens when you stay in the sun too long?	Painful redness, blistering, peeling	Blistering followed by peeling	Burns sometimes followed by peeling	Rare burns	Never had burns	
To what degree do you turn brown?	Hardly or not at all	Light colour tan	Reasonable tan	Tan very easily	Turn dark brown quickly	
Do you turn brown within several hours after sun exposure?	Never	Seldom	Sometimes	Often	Always	
How does your face react to the sun?	Very sensitive	Sensitive	Normal	Very resistant	Never had a problem	
Tanning Habits						
When did you last expose your body to the sun or sunbed?	More than 3 months ago	2 - 3 months ago	1 - 2 months ago	Less than a month ago	Less than 2 weeks ago	
How often have you been tanning recently?	Never	Hardly ever	Sometimes	Often	Always	
						Total Score

Skin Type Score	Fitzpatrick Skin Type	MED J/m ²
0 - 7	I	-
8 - 16	II	250
17 - 25	III	350
26 - 30	IV	450
Over 30	V-VI	450

Client Skin Type is:.....

MED (J/m²):.....

Appendix D Consent form

Each client should read and sign a consent form like this (the version in the Standard can be copied and used instead if you prefer).

A copy of the form should be provided to the client. You should store your copy for at least two years.

SOLARIUM CONSENT FORM

Please read the following information carefully

- (1) Tanning units emit ultraviolet radiation.
- (2) Exposure to ultraviolet radiation such as from a tanning unit contributes to the skin ageing process and skin cancer.
- (3) Intentional tanning unit exposure should be avoided for 48 hours before and after sunlight or tanning unit exposure.
- (4) Protective eyewear must be worn at all times while undergoing tanning unit exposure.
- (5) If you have fair skin and burn easily you will not be permitted to use a tanning unit.
- (6) If you are under the age of 18 years you will not be permitted to use a tanning unit.
- (7) There is additional risk, and tanning unit exposure is not recommended, if you:
 - (a) have ever been treated for solar keratoses or skin cancer, or
 - (b) have a large number of moles, freckles or naevi, or
 - (c) have a history of frequent childhood sunburn, or
 - (d) burn easily, or
 - (e) have ever suffered from an abnormal reaction, or allergy, to light.
- (8) There may be further risk if you are pregnant, taking certain medications by mouth or applying medications or certain cosmetics to the skin.

If there is any doubt in your mind in relation to any of the particulars described in items (3), (7) or (8) above, consult your doctor before undergoing any ultraviolet exposure.

Consent

- (1) I,.....[Name],
of.....[Address],
am over the age of 18 years.
- (2) I acknowledge that I have read and fully understand the above information.
- (3) I consent to being exposed to ultraviolet radiation from a tanning unit in this establishment.
- (4) I have not been exposed to ultraviolet radiation from a tanning unit in the last 48 hours.

.....
Signed (client)

.....
Signed (operator)

.....
Date

.....
Date

.....
Name of establishment

Appendix E Record of tanning sessions

CLIENT RECORD	
Name:	Phone:.....
Initial interview date:.....	
Skin Type:	MED: J/m ²
Maximum initial exposure (0.5 MED):.....J/m ²	
Maximum exposure (0.9 MED):J/m ²	

Exposure plan

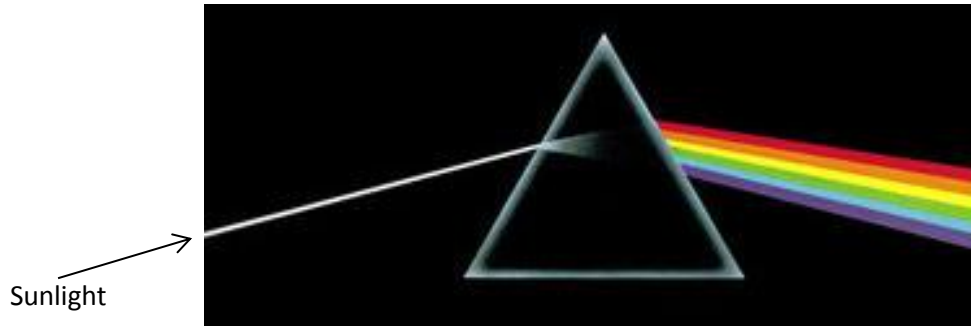
Date	Time	Unit	Session Duration	Comments

Date	Time	Unit	Session Duration	Comments

Appendix F Effective UV irradiance UVR_{eff}

Ultra-violet light

When sunlight passes through a glass prism, it is broken up into the different colours of light which make it up.



The different colours (red, green, blue etc) are distinguished by a property of the light called its wavelength.

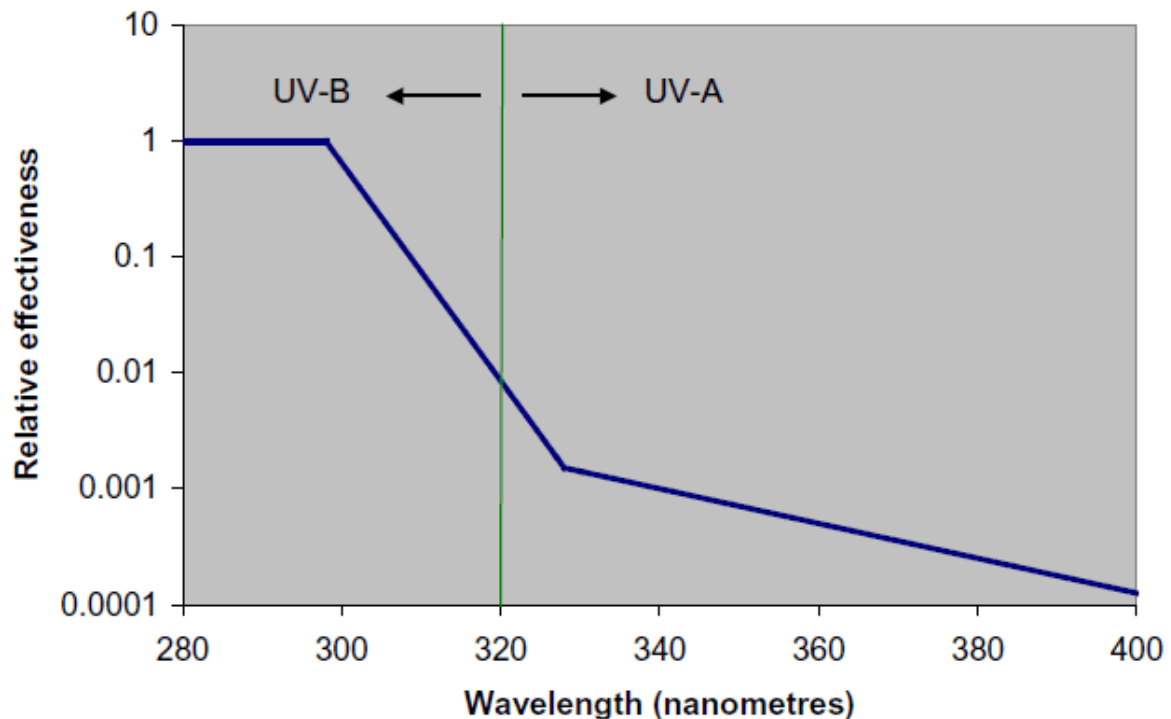
Our eyes only respond to a particular range of wavelengths, that make up what is called the “visible spectrum” of light. However, the sun also produces other wavelengths which we cannot see, but which we can nevertheless experience. Amongst these are infra-red and ultra-violet.

- If we were able to see infra-red wavelengths, they would show up above the red colour in the figure above. While we cannot see infra-red, we experience it as a feeling of warmth on the skin.
- If we were able to see ultra-violet wavelengths, they would show up below the purple colour in the figure above. We can neither see nor feel ultra-violet directly, but ultra-violet causes some chemical reactions in the skin which we eventually experience as sunburn if our skin is exposed for long enough. (In the longer term, other reactions can go on to cause skin cancer, or make the skin lose its elasticity.)

Ultra-violet (UV) wavelengths are divided into three regions: UV-A, UV-B and UV-C. UV-C from the sun is all absorbed in the atmosphere. Specialised lamps can also produce UV. The Standard requires that the UV lamps used in sunbeds do not produce any UV-C.

Effects of UV-A and UV-B

UV with a wavelength between 320 and 400 nanometres (nm) is called UV-A, whereas UV with wavelengths between 280 and 320 nm is called UV-B. UV-A and UV-B both produce harmful effects on the skin, including sunburn, loss of elasticity and skin cancer. UV-B is much more effective than UV-A at causing these harmful effects. The relative effectiveness of different wavelengths of UV at producing sunburn is shown in the graph below.



Note that the scale up the side of the graph, showing the relative effectiveness of the different wavelengths of UV, is compressed in order to accommodate the huge range of values.

For example, UV-B with a wavelength of 300 nm has a relative effectiveness of 1, while UV-A with a wavelength of 325 nm has a relative effectiveness of 0.002. This means that the 325 nm UV-A is 500 times less effective at producing sunburn than 300 nm UV-B. If you had a lamp which only produced 325 nm UV-A, it would need to be 500 times more intense (“brighter”) than a lamp which only produced 300 nm UV-B to cause the same effects.

UV lamps produce a wide range (or “spectrum”) of UV-A and UV-B wavelengths (as well as a lot of visible light). In order to compare the effects of different lamps, we need to know the intensity at each wavelength. If we add up the intensities at each wavelength, this will tell us the total amount of UV that the lamp produces. However, that does not tell us how effective the lamp is at causing sunburn (or other effects). To determine the effectiveness of the UV lamp - the *effective UV irradiance* (UVR_{eff}) - we need to multiply the intensity at each wavelength by the relative effectiveness at that wavelength, and then add those up over the whole UV spectrum.

For example, suppose we have a lamp which only produces 325 nm UV-A. We measure the intensity (strictly: the *irradiance*) of the lamp and find that it is 2 watts per square metre (W/m^2). Because the relative effectiveness at this wavelength is 0.002, the effective UV irradiance (UVR_{eff}) of the lamp is $2 \times 0.002 = 0.004 \text{ W}/\text{m}^2$.

If we had a lamp that only produced 300 nm UV-B (relative effectiveness = 1) with the same intensity ($2 \text{ W}/\text{m}^2$), the effective UV irradiance would be $2 \times 1 = 2 \text{ W}/\text{m}^2$.

The key thing to remember from this discussion is that knowing the effective UV irradiance (UVR_{eff}) of your sunbed is critical in determining how long clients should be allowed to spend on the bed.

Appendix G Developing a table of exposure times

Note: this is an example only. You will have to develop your own table(s), based on the UVR_{eff} of your own sunbed(s).

Assume that $UVR_{eff} = 0.46 \text{ W/m}^2$, and that we wish to build up to the maximum session time over 5 sessions.

In the table below we calculate, for each skin type, the maximum exposure time for the first session (ie the exposure time which will give a UV dose of 0.5 MED) and the maximum exposure time for any session (the exposure time which will give a UV dose of 0.9 MED).

	Skin type	II	III	IV, V, VI
	MED	250 J/m ²	350 J/m ²	450 J/m ²
Maximum time on sunbed – first session	$0.5 \times \frac{\text{MED}}{UVR_{eff}}$	$0.5 \times \frac{250}{0.46}$ = 272 Seconds	$0.5 \times \frac{350}{0.46}$ = 380 Seconds	$0.5 \times \frac{450}{0.46}$ = 489 Seconds
Maximum time on sunbed – any session	$0.9 \times \frac{\text{MED}}{UVR_{eff}}$	$0.9 \times \frac{250}{0.46}$ = 489 Seconds	$0.9 \times \frac{350}{0.46}$ = 685 Seconds	$0.9 \times \frac{450}{0.46}$ = 880 Seconds

This table shows, for example, that someone with skin type III should start with a session time of 380 seconds and build up to 685 seconds.

We can use this information to make the exposure time table, by gradually building up from the initial session time to the maximum time.

Exposure times for sunbed with $UVR_{eff} = 0.46 \text{ W/m}^2$			
	<i>Skin type</i>		
	<i>II</i>	<i>III</i>	<i>IV, V, VI</i>
	Exposure time (seconds)		
Session 1	272	380	489
Session 2	326	457	587
Session 3	380	533	685
Session 4	435	609	783
Session 5 and above	489	685	880

You could convert these times to minutes. If the timer does not permit setting times in fractions of a minute, round down to the nearest minute.

Note that these tables are only valid for units confirmed to have UVR_{eff} of 0.46 W/m^2 .