

Radiation Protection Services

Guidelines for Tanning Salon Operators



BC Centre for Disease Control
AN AGENCY OF THE PROVINCIAL HEALTH SERVICES AUTHORITY

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GLOSSARY OF TERMS

- Corium** lowest (innermost) layer of cells in the skin.
- Delayed tanning** tanning process resulting in an increase in the amount of melanin pigment produced in the skin.
- Epidermis** outer layers of skin in which melanin is found, and where tanning occurs.
- Erythema** the medical term for inflammatory redness of the skin. It can be produced by exposure to UVR, particularly UVB radiation. When this happens, it is commonly called "sunburn".
- Immediate pigment darkening** tanning process that darkens only the melanin pigment already present in the skin.
- Melanin** pigment in the skin which becomes darker when exposed to ultraviolet radiation.
- Melanoma** most serious form of skin cancer.
- Photokeratitis and photoconjunctivitis** painful injuries to the unprotected eye caused by overexposure to UVR
- Stratum corneum** tough outer layer of dying skin cells.
- UVA** ultraviolet radiation (sometimes called "long wave" radiation - 320 to 400 nanometres) most common in commercial tanning equipment
- UVB** ultraviolet radiation (sometimes called "short wave" radiation - 280 to 320 nanometres) responsible for most sunburns as well as long lasting tans. UVB is found at varying levels in all commercial tanning devices.
- UVR** ultraviolet radiation - includes the entire spectrum (100 to 400 nanometres) of ultraviolet radiation, including UVC radiation (100 - 280 nanometres).

INTRODUCTION

Prolonged exposure to Ultraviolet (UV) A and B radiation can cause sunburns, premature skin aging, skin cancers, cataracts and other eye and skin diseases. It has been shown that UV can affect the immune system of the skin.

The rate of skin cancer in the British Columbia population has doubled over the last 20 years. In Canada this year about 80,000 Canadians are expected to develop skin cancer. One in seven of today's children is expected to develop some form of skin cancer in his or her lifetime. Evidence indicates that 85 per cent or more of all skin cancers are caused by exposure to UV radiation.

When a person chooses to acquire or enhance a tan using a tanning salon facility, it is important for that person to be aware of the hazards involved, so they can make an informed decision about the amount of exposure they receive. This booklet is designed to give owners and staff of tanning salons a fundamental knowledge of ultraviolet radiation, and its effects on people exposed to the various types of UV radiation. It discusses the risks of tanning, provides information on certain products that increase that risk, and provides a list of general guidelines for tanning salon personnel to help reduce health risks both to their clients and to themselves. The final section contains a series of questions and answers for tanning salon personnel which lets them test their knowledge and understanding of the information in this booklet.

Public Health Officials may refer to this document and to the Ministry of Health's *Guidelines for Personal Services Establishments** when assessing whether a tanning salon is being operated in accordance with the Personal Services Establishment Regulation. However, following the guidelines listed in this document does not relieve the operator from the obligation to take any additional measures necessary to prevent health hazards from occurring in the establishment. Operators are also responsible for ensuring that they are carrying on business in compliance with municipal and other regulatory requirements, and for obtaining business licenses and/or operating permits from the appropriate licensing authorities.

*Note: The Guidelines for Personal Services Establishments can be viewed on the internet, at:

<http://www.health.gov.bc.ca/library/publications/year/2000/pse.pdf>

RISKS OF TANNING

Sunburn

Sunburn (or erythema) is an inflammatory redness of the skin, caused by too much exposure to UV radiation, particularly UVB radiation. When the skin can't produce enough melanin or isn't thick enough to protect itself from UV radiation, the skin begins to burn. The small blood vessels in the skin dilate and increase the blood flow to the skin's surface, making it sore and appear red. This reaction can be almost immediate in severe cases, or may develop up to 24 hours later in less severe cases of overexposure.

People with fair skin who always burn and never tan are genetically incapable of producing sufficient melanin in their bodies to allow tanning. They will always burn, whether in the sun or when using tanning equipment.

Premature Aging

UVR causes premature aging effects such as skin thickening, wrinkling and hardening. Overexposure to UVR can also make the skin more fragile and vulnerable to damage.

Skin Cancer

Skin cancer is the most common form of cancer in Canada. In 2004, an estimated 76,000 new cases of this increasingly prevalent skin disease are expected. If current trends continue, one in seven of today's children will develop skin cancer during their lifetime.

Squamous and basal cell cancers are the most common, but rarely fatal, forms of skin cancer. Exposure to UV radiation causes these forms of cancer.

Malignant melanoma is a less common, but potentially deadly, type of skin cancer. Melanoma has been linked to intense intermittent and long-term exposure to ultraviolet radiation during childhood or the teenage years. Other risk factors for melanoma include a family history of melanoma, and physical attributes such as having lots of moles, and/or red or blond hair. Melanoma usually affects people from 35 to 50 years of age. (Source: Canadian Dermatology Association.)

The risk of developing skin cancer increases as total exposure to UVR increases. People with fair skin who burn easily are also most at risk of developing skin cancer.

Eye Problems

Ultraviolet radiation may cause painful temporary injuries to the cornea and conjunctiva, called photokeratitis and photoconjunctivitis. These injuries – normally caused by too much UVB or UVC radiation – are more commonly known as 'welder's flash' or 'snow blindness'. These conditions may develop from 2 to 24 hours after exposure, but usually occurs within 6 to 12 hours. UVA radiation may cause eye aging effects, such as browning of the lens and loss of elasticity. Overexposure to UVB can cause cataracts in the lens. Some people have also reported retina damage due to too much UVR.

RISKS ASSOCIATED WITH TANNING SALONS

Risks of Overexposure to UV Radiation

A serious, although rarely occurring health risk associated with tanning salons is that of extreme overexposure to UV radiation during a single session which results in a serious case of erythema, or “sunburn”. These cases, although relatively rare, have caused serious harm to affected tanning salon clients. These incidents have usually been attributed to operator error in under-estimating the strength of the UV radiation being emitted from the equipment and/or over-estimating the maximum time that an artificial tanning session should last.

Maximum exposure times for different skin types depend on the strength and type of ultraviolet emissions from the ultraviolet light bulbs used in each individual piece of tanning equipment. There are many different models and brands of ultraviolet light bulbs available on the market, producing varying intensities and emitting different amounts of UVA and UVB radiation.

While all pieces of tanning equipment are required to carry specific information about maximum exposure times and minimum intervals between exposures, this information is based on the bulbs provided with the original equipment, when it was first manufactured. It is not uncommon, however, for replacement bulbs installed in tanning equipment by operators as part of their routine maintenance program to have different – and often higher – levels of ultraviolet emissions than the original manufacturer’s bulbs. Cases of overexposure to UV radiation have occurred as a result of clients being exposed to tanning equipment which has had its original bulbs replaced with newer, more powerful bulbs which have shorter maximum exposure times than those times which may be shown on the equipment.

For this reason, it is essential that operators ensure that clients are informed as to the maximum exposure time (in minutes) and the minimum time interval needed between consecutive exposures for the particular make and model of bulbs that are actually installed in each separate tanning machine.

The best way to determine how much UVA a bulb (or bulbs) is emitting is to measure it. Checking the bulb UVA output from time to time will assist operators in adjusting the recommended tanning times for first time users as the bulbs age and when new bulbs are purchased. Small, portable UVA meters are commercially available for this purpose.

Operators should not rely on the manufacturer’s information on the exterior of the tanning device if there is any possibility that the bulbs may not be the same type as those installed with the original equipment. That information will only be correct if the original bulbs are still in place, or if bulbs identical to the originals have been used as replacements.

Operators should also note that:

- (a) Maximum exposure time cannot be increased to compensate for decreasing UV intensity as bulbs age; and
- (b) Different beds have different maximum exposure times. A client accustomed to tanning on a bed with a high proportion of UVA radiation must be advised that they cannot have a similar exposure time on a UVA tanning bed with a higher proportion of UVB radiation.

Risks of Infection

There is also a risk of transmission of infectious diseases (e.g. Pink Eye) from sharing of protective eyewear equipment. It is therefore recommended in these guidelines that customers of tanning salons be encouraged to purchase their own personal protective eyewear equipment for their own personal and exclusive use. If protective eyewear equipment is provided by the tanning salon, it should either be single-use and disposed of after use on a single client, or else such equipment must be disinfected after each use in accordance with the requirements for "Semi-Critical Items" as defined in the Ministry of Health's *Guidelines for Personal Service Establishments* (Section 4.A ii).

<http://www.health.gov.bc.ca/library/publications/year/2000/pse.pdf>

Risk of Overhead Bulbs Breaking

Another risk from tanning salons is the danger of the client getting injuries as a result of the overhead bulbs in two parts or hinged tanning beds breaking and showering the client with broken glass. This may result from the client accidentally bumping against the overhead bulbs. It has also happened when an improperly installed bulb has simply fallen out of its socket and fallen onto the client. In either case, this danger can be minimized by ensuring that some form of physical barrier (i.e. a clear UV-transmitting acrylic cover) is in place between the lamps and the person being exposed to UV radiation, over the top section of two part or hinged tanning beds as well as over the bottom section. This barrier will prevent injury to the user of the equipment in case of accidental lamp breakage. It will also guard against burns from too close contact with the bulbs.

HEALTH & SAFETY GUIDELINES

Owners/operators of tanning salons should refer to the Ministry of Health Services publication: "*Guidelines for Personal Service Establishments*", available from the Environmental Health office of your local Health Authority or <http://www.health.gov.bc.ca/library/publications/year/2000/pse.pdf>. These guidelines describe the minimum standards necessary to prevent health hazards from occurring in Personal Service Establishments as required under the *Personal Service Establishments Regulation* of the *Health Act*. In addition, operators should follow the guidelines listed below, which have been developed specifically for tanning salon operations.

A. – General Guidelines

1. Informed Consent:

Operators of tanning salons must consider the issue of informed consent by their customers, in addition to taking measures to prevent disease transmission and injury. It is recommended that operators seek legal advice on the development and use of a declaration of health risks and consent to being exposed to UV radiation, which should be completed and signed by each customer prior to their using tanning equipment. Operators should satisfy themselves that their customers are aware of the health risks associated with exposure to UV radiation. It is recommended that tanning clients be advised to consider discussing the risks of artificial tanning with their family physicians. In order to give their informed consent, minors must have the maturity to and must understand all the implications of exposure to UV radiation. It is recommended that operators require minors to obtain written parental consent.

2. Children, Teens are Most Vulnerable

People normally get their lifetime exposure to UV radiation throughout their life. Research shows that the risk of getting skin cancer increases as exposure to UV radiation increases. Research also shows that a person's chance of getting the less common but more deadly form of skin cancer – malignant melanoma – as an adult is twice as high if they had one or more serious sunburns when they were young. For these reasons it is important to make sure that children and teenagers are protected from overexposure to UV radiation, and that they understand the increasing long term health risks as a result of increasing exposure to ultraviolet radiation.

While minors are not prohibited from using tanning salons, the use of tanning salons – particularly by minors – is not recommended for the health reasons described in these guidelines.

3. Evaluate Your Customers

People who always burn and never tan should be advised not to use tanning units. People who do not tan easily (for example, fair-skinned adults with red or blond hair and freckles) should not use tanning units for as long a time as adult customers with dark skin and hair. While minors are not prohibited from using tanning salons, the use of tanning salons – particularly by minors – is not recommended for the health reasons described in these guidelines. Anyone who has a skin infection, rash or other skin condition should not use a tanning salon until the problem is resolved or a doctor has been consulted.

4. Inform Your Customers

Make sure that your clients are informed about factors which could adversely affect their tolerances to ultraviolet radiation exposure. This should include information about both oral and topical medications, and cosmetics or lotions applied to the skin (see Appendix D).

5. Delayed or Adverse Reactions

Clients should be advised that they may have a delayed, adverse reaction to UV exposure (i.e. red, irritated and watering eyes, or an itching skin rash or sunburn) *after* they leave the tanning salon. This delayed reaction can take anywhere from less than an hour to as long as a day and a half to develop. If such adverse reaction is serious, they should be advised to consider seeing their doctor. They should also be asked to notify the tanning salon operator of their reaction.

B. – Equipment Guidelines

1. Compliance with Federal Regulations

All sunlamps, including tanning beds, must comply with the regulations specified for sunlamps under the Federal government's *Radiation Emitting Devices (RED) Act* (Appendix E), which governs the sale, lease and import of these devices. Operators should check with their equipment supplier to ensure that their sunlamps and tanning beds comply with this Act before purchasing any new, used or replacement equipment.

2. Staff Attendance, Knowledge and Testing

You should make sure that an operator or staff member who can inform and assist the public in the safe use of the tanning devices is always available during business hours. Staff should be familiar with these guidelines, and have completed the questionnaire at the back of this booklet to evaluate their knowledge.

3. Exposure Times Must Be Based on Current, Installed Bulbs.

Operators must ensure that clients are informed as to the maximum exposure time (in minutes) and the minimum time interval needed between consecutive exposures for the particular make and model of bulbs that are actually installed in each separate tanning machine.

4. Regular Testing of Bulbs

It is recommended that operators check the intensity of the bulbs' UVA output when new bulbs are installed, and from time to time afterwards, to make sure the operator is able to determine the correct recommended maximum exposure times based on the actual output of the bulbs. Small, portable UVA meters are commercially available for this purpose.

5. Loss of Intensity in Aging Bulbs

Maximum exposure time for clients can *not* be increased to compensate for decreasing UV intensity as bulbs age.

6. Different Equipment Used by Same Client

Different beds have different maximum exposure times. A client accustomed to tanning on a bed with a high proportion of UVA radiation must be advised that they cannot have a similar exposure time on a UVA tanning bed with a higher proportion of UVB radiation.

7. Accessible “On - Off” Switch

Make sure that each tanning device can be easily turned off by the person who is being exposed, without their having to disconnect the electrical plug or remove the ultraviolet lamp (a requirement of the Federal *Radiation Emitting Devices Act* (RED) regulations).

8. Protective Eye Wear Must Be Provided

Make sure that each client/customer is provided with – and instructed on how to wear – ultraviolet radiation safety eyewear, which covers the eyes securely.

9. Eyewear Must Meet Certain Criteria

Protective eyewear used with sunlamps or tanning beds must meet two criteria (derived from the RED Regulations):

- (a) The user must be able to see through them clearly enough to read the labels and operate the controls on the tanning equipment.
- (b) The eyewear must attenuate the shortwave ultraviolet radiation (200-320 nm) by a factor of at least 1,000, and attenuate the long-wave ultraviolet radiation (320-400 nm) by a factor of at least 100.

A list of eyewear which has met these specifications is reproduced in Appendix C. Eyewear may also be tested by the Radiation Protection Services, BC Centre for Disease Control (Main Floor, 655 12th Ave W, Vancouver 604.707.7442) for compliance.

10. Eyewear Use

It is recommended that customers of tanning salons be encouraged to purchase their own personal protective eyewear equipment for their own personal and exclusive use.

11. Prevention of Eye Infection

If protective eyewear equipment is provided by the tanning salon, it should either be single-use and disposed of after use on a single client, or else such equipment must be disinfected after each use in accordance with the requirements for “Semi-Critical Items” as defined in the Ministry of Health’s *Guidelines for Personal Service Establishments* (Section 4.A ii).

C. – Facility Guidelines

1. Warning Signs

Make sure that ultraviolet radiation warning signs, approved by the local Medical Health Officer, are posted in plain view and easily readable at all tanning locations within the facility, and in the client reception area as well. The local health authority will supply the necessary signs to be posted.

2. Protection Against Lamp Breakage

Ensure that a physical barrier (i.e. a clear UV-transmitting acrylic cover) is in place between the lamps and the person being exposed to UV radiation, over the top section of two part or hinged tanning beds as well as over the bottom section. This barrier will prevent injury to the user of the equipment in case of accidental lamp breakage. It will also guard against burns from too close contact with the bulbs. The Federal *Radiation Emitting Devices Act* (RED) regulations specify that every tanning bed must have a physical barrier such as plexi-glass between the UV lamps and the user to prevent contact.

3. Employee Protection During Maintenance

Whenever maintenance is being performed on any of the tanning equipment (i.e. changing UV bulbs, cleaning equipment, etc.) ensure that employees either turn off all the tanning bulbs while working on or around the equipment, or else wear protective eyewear and clothing to minimize their exposure and protect against potential damage to their eyes and skin.

4. Adequate Ventilation

Ensure that adequate ventilation is provided in such a way that the tanning booth/room does not exceed 30°C.

5. General Infection Control

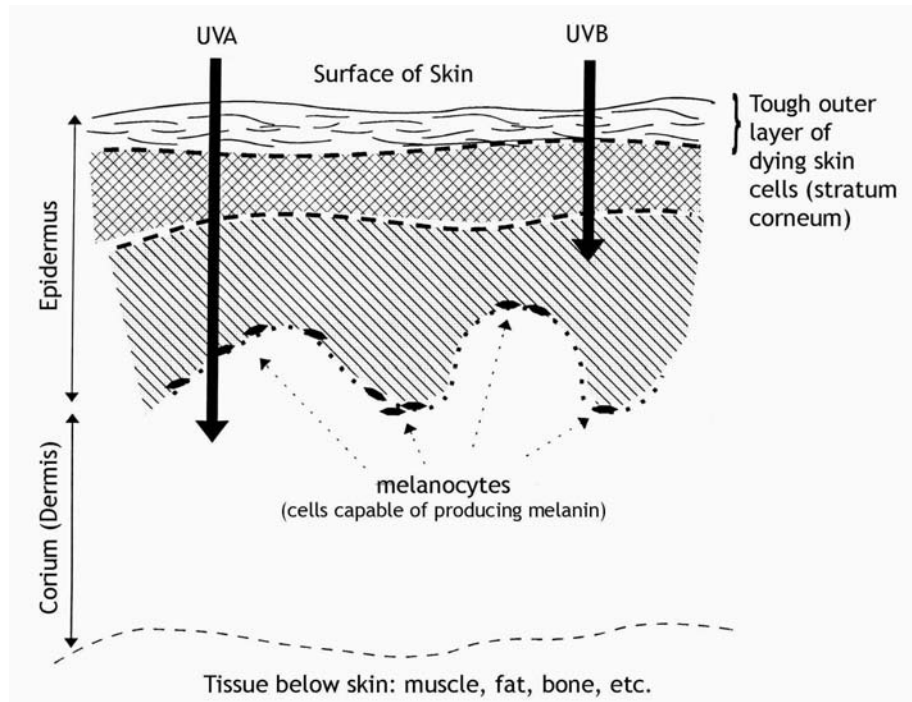
Ensure that common contact surfaces, including protective eyewear, are disinfected between each use, with a low level disinfectant. Refer to the Ministry of Health's "*Guidelines for Personal Service Establishments*", Section 4, regarding the importance of proper hand-washing, and the use and care of critical items, including sterilization of equipment and disposal of wastes.

The Ministry of Health Services welcomes written comments and/or suggestions on these guidelines, and will take any such feedback into consideration for future revisions. Comments should be addressed to Public and Preventive Health Services, Ministry of Health, 1515 Blanshard Street, Victoria, BC V8W 3C8 or Radiation Protection Services, BC Centre for Disease Control, 655 12th Avenue West, Vancouver, BC V5Z 4R4.

APPENDIX A - The Tanning Process

Skin is made up of basically two sections, the epidermis (outer layer) and the corium (dermis or inner layer). The innermost section or corium is formed of tissues containing nerves, blood vessels, lymphatics and fatty tissue. The outer section or epidermis is made up of a series of layers. Cells are created in the bottom or innermost layer of the epidermis. As they age, they travel from the innermost layer of the epidermis, through the middle layers, out toward the surface of the skin where they die. This surface layer (or stratum corneum) forms a tough outer protective covering. As the cells move outward, they lose moisture, flatten and eventually flake off the surface of the skin. This process takes about 28 days.

CROSS SECTION OF THE SKIN



Tanning: There are two effects that occur in the skin following exposure to UV radiation. When the skin is exposed to ultraviolet radiation a slight, immediate pigment darkening or immediate tanning is sometimes observable. It is believed to result from darkening of the melanin pigment that is already present in the epidermis as it absorbs and filters out some of the damaging UV radiation. This tan is only temporary, and fades within 3 to 36 hours after exposure. This type of tan is strongly stimulated by UVA radiation.

A second process known as "delayed tanning" occurs in some individuals when the skin is exposed to ultraviolet radiation. This process causes two responses: **a)** more melanocytes (skin cells capable of producing melanin pigment) are produced at the base of the epidermis, and each melanocyte produces more melanin pigment. These melanin-containing cells begin to distribute themselves throughout the layers of the skin, as they work their way toward the surface of the skin. This greater presence of melanin-containing cells causes the skin to appear darker in colour; **b)** the tough outer or surface layer of dying skin cells thickens and absorbs more of the hazardous shortwave UVB radiation, thereby increasing protection to the inner living skin tissue from the harmful rays. This second, two-part process takes one or more days to happen, and produces a noticeable tan within a few days that can last for weeks or even months.

APPENDIX B - Forms of Radiation

Ultraviolet Radiation (UVR) is a form of electromagnetic energy with wavelengths ranging from 100 to 400 nanometres. These wavelengths can be divided into UVA (wavelength 320 to 400 nanometres), UVB (wavelength 280 to 320 nanometres) and UVC radiation (100 to 280 nanometres).

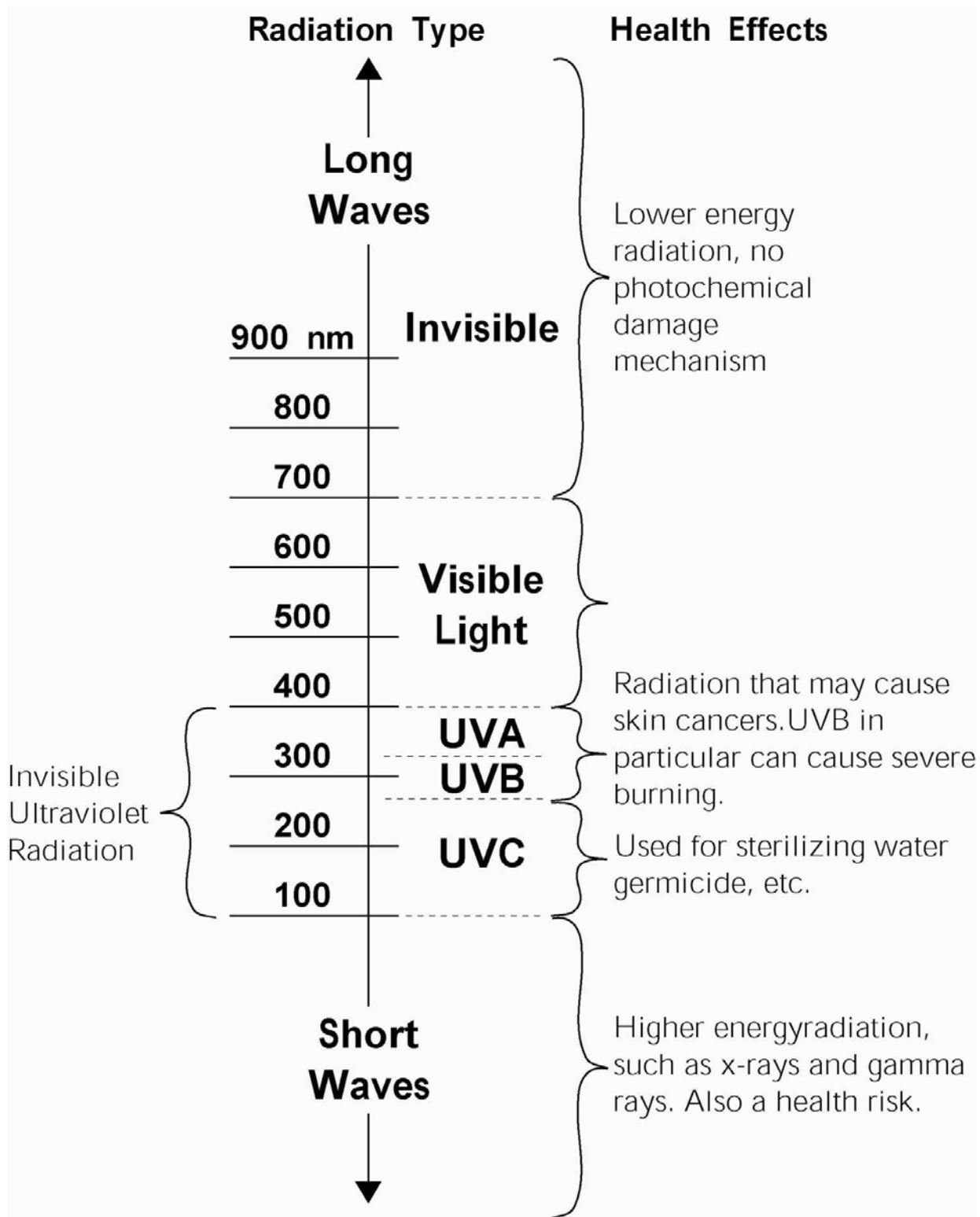
UVA (wavelength 320 to 400 nanometres, sometimes known as “black light” or “long-wave” radiation) carries less energy than UVB and UVC, although UVA penetrates more deeply into the skin and underlying tissues. UVA is about 1,000 times more effective than UVB in producing an immediate tanning effect, by causing the melanin in the epidermis to darken immediately (i.e. as soon as the skin is exposed). Intense, prolonged exposure to UVA can burn sensitive skin. Prolonged UVA exposure can damage underlying structures in the corium and causes premature aging of the skin.

UVB (wavelength 280 to 320 nanometres, sometimes called “shortwave” radiation) carries much more energy than the longer waved UVA radiation, although it does not penetrate as deeply into the skin as UVA. UVB is 1,000 times more likely to cause sunburn (erythema) than UVA. Exposure to UVB causes a delayed tanning effect – that is, it takes two or three days for the tan to appear. Repeated exposure to UVB radiation also causes skin thickening and a longer lasting tan. Various factors may influence how a person will react to exposure to UV radiation, including skin type, length of exposure, and genetic background. To help you remember that UVB is 1,000 times more able to cause sunburn than UVA, remember: “B is for Burn”.

UVC radiation from the sun is completely absorbed by the earth’s atmosphere, and does not reach the surface of the earth. This is fortunate since UVC radiation is very dangerous to all forms of life, even with only very short exposures. Modern tanning equipment does not emit significant levels of UVC radiation.

Most tanning beds typically produce from 5 to 20 m/W cm² (milliwatts per square centimetre) of UVA. That’s three to eight times more UVA than the sun produces at midday during summer in B.C. Face tanners generally emit much more UVA than tanning beds. NOTE: Some newer, non-fluorescent technology tanning beds can emit more than 60 m/W cm² – which is 25 times more than the UVA produced by the sun at midday.

All tanning beds also emit varying amounts of UVB. The amount of UVB emitted varies with each lamp. Even tanning lamps labeled ‘Only UVA’ still emit some UVB. Some lamps may emit ten times more UVB than others, producing significant sunburn in a short time, even to people who have previously used tanning lamps.



APPENDIX C - Protective Eyewear for Sunlamps

Protective eyewear used with sunlamps or tanning beds must meet the following two criteria:

- 1) The user must be able to see through them, clearly enough to read the labels and operate the controls.
- 2) The eyewear must attenuate the shortwave ultraviolet radiation by a factor of at least 1,000 and attenuate the long-wave ultraviolet radiation by a factor of at least 100.

To date the following eyewear products have been tested by the Radiation Protection Services and found to meet both criteria above:

- a) Super Sunnies, Lucas Products Corp, USA
- b) Le String, Irex100, by Bolle, France
- c) Eurotan Blinkers, Eye Pro Inc, USA
- d) Wink Ease, Eye Pro
- e) Ultra Eyes
- f) Ten Stück Sonnen Clip
- g) Peepers, 1992 California SunCare, Inc
- h) Hytique EyeLids
- i) Sun-clipse, Apollo's St. Louis, Missouri
- j) Australian Gold EZ Eyes, and Australian Gold EyeCandy
- k) SunGlobes, World SunCare Products Corp
- l) Sunsets Ultra-Violet Eye Protection, California Tan
- m) Viewkeepers
- n) Prospects, California Tan
- o) oogle's, Oogle's Inc, Texas

The following do not meet the criteria above:

- a) Cool Eyes Inc (does not meet criteria #1)

APPENDIX D - Products That Increase the Risk

Many products, including prescribed medications, over-the-counter patent medicines, and a wide range of personal care products can increase the skin's sensitivity to UVR. This can result in photosensitivity, an intense reaction of the skin to UVR which can cause burning (or erythema) in a much shorter time period than would normally be expected.

Photosensitivity can be caused by products applied directly to the skin (contact photosensitizing agents) or from medications or other substances that have been ingested.

The article below, which lists a number of agents that may cause photosensitivity reactions, is reproduced with permission of the Marshall University School of Medicine, Huntington, WV, USA.

Because there are literally hundreds of known photosensitizing agents under these general categories, clients taking any medications or using any of the other products listed below should consult a physician or pharmacist before tanning.

DRUG-INDUCED PHOTOSENSITIVITY

Many drugs can cause skin to become very sensitive to the sun or the type of light used in tanning booths. This reaction is called 'Drug-Induced Photosensitivity'. Drugs which you take by mouth and drugs which you apply on the skin can cause this reaction.

Photosensitivity reactions can be divided into two groups:

- Phototoxic reactions
- Photoallergic Reactions

Phototoxic reactions are dose related and can be seen to a slight degree in most people taking these medications who are exposed to enough sunlight. Photoallergic reactions involve the immune system and may be similar to other allergic reactions, swelling, rashes, and hives.

The drugs cause this reaction by absorbing ultraviolet light or visible light. Therefore, it may surprise you to learn that agents which are used in sunscreens can also cause photosensitivity reactions. The ability to absorb light is normally part of the physical chemical activity of the drug as opposed to its clinical effect.

Types of photosensitivity reactions include:

- Abnormal and extreme sunburn
- Stinging and Burning
- Vesicles
- Hives
- Swelling

Some of the drugs which are well known to cause photosensitivity reactions include Nalidixic Acid (NegGram), Doxycycline (Vibramycin, Vibratabs), and Hydrochlorothiazide (HCTZ, Hydrodiuril, Oretic, others). Other less known drugs, which cause photosensitivity reactions, include estrogens (for example, birth control pills and Premarin) and oral medications for diabetes to name a few. However, there are great differences in the frequency and severity of reactions from patient to patient. Some patients may develop blisters after a brief exposure to sunlight while others will have no reaction at all. Most will have a slight, probably unnoticeable, reaction.

Lists of Drugs Which Can Cause Photosensitivity Reactions

Antibiotics which commonly cause photosensitivity reactions

- Doxycycline (Vibramycin, Vibratabs)
- Demeclocycline (Declomycin) - High Incidence. Reactions to fingernails and skin usual manifestation.
- Tetracycline (Achromycin and others)
- Nalidixic Acid (NegGram)
- Lomefloxacin (Maxaquin)
 - Especially noted for severe reactions when they occur.

Blood Pressure and Heart Medications which commonly cause photosensitivity reactions

- Hydrochlorothiazide (Hydrodiuril, Oretic and other names)
 - Many, many drugs contain HCTZ as one of the ingredients.
- Chlorothiazide (Diuril and other names)
- Furosemide (Lasix)
- Amiodarone (Cordarone) - high incidence of drug-induced photosensitivity reactions.

Other Drugs which commonly cause photosensitivity reactions

- Chlorpromazine (Thorazine)
- PABA and/or PABA esters
 - Commonly used in sunscreens. Reactions may occur after repeated use and are in the form of rashes and hives (an immune reactions), not sunburn.

Other drugs which less commonly cause photosensitivity reactions

- Alprazolam (Xanax)
- Amitriptyline (Elavil, Endep and other names)
- Benzocaine (Sensorcaine and many other numbing products)
- Captopril (Capoten)
- Chlordiazepoxide (Librium)
- Chloroquine
- Chlortetracycline
- Ciprofloxacin (Cipro)
- Co-trimoxazole (Bactrim, Septra)
- Dapsone
- Diltiazem (Cardizem, and other names)
- Diphenhydramine (Benadryl, Benylin, and other names)
- Enoxacin (Penetrex)
- Estrogens (Birth Control Pills, Premarin, and more)
- Fluorouracil (5-FU)
- Glyburide (Diabeta, Micronase, Glynase, and other names)
- Griseofulvin (GrisPeg, Fulvicin, and other Names)
- Haloperidol (Haldol)- uncommon
- Hydralazine (Apresoline)
- Ibuprofen (Advil, Motrin, and other names)
- Isoniazid (INH)
- Isotretinoin (Accutane)
- Methotrexate
- Minoxidil (Loniten, Rogaine)
- Naproxen (Naprosen, Alleve, other names)
- Nifedipine (Procardia, Adalat)
- Norfloxacin (Noroxin)
- Nortriptyline (Aventyl, and other names)
- Ofloxacin (Floxin)
- Oral Contraceptives
- Oxytetracycline (Terramycin)
- Perfenazine (Trilafon)
- Phenylbutazone (Butazolidin)
- Phenytoin (Dilantin)
- Piroxicam (Feldene) - Not rare for a photosensitivity reaction to occur.
- Prochlorperazine (Compazine)
- Promethazine (Phenergan)
- Protriptyline (Vivactil)
- Quinidine (Quinidex, Quinaglute, Cardioquin, other names)
- Quinine (Quinamm)
- Sulfonamide antibiotics (Bactrim, Septra, Gantrisin, and others)
- Thioridazine (Mellaril)
- Thiothixene (Navane)
- Tolbutamide (Tolinase)
- Tretinoin (Retin-A)
- Trifluoperazine (Stellazine)
- Vitamin A

APPENDIX E - Radiation Emitting Devices Act

Regulations Amending the *Radiation Emitting Devices Regulations (Tanning Equipment)*

Note: these regulations have been reproduced from the 2005-02-23 Canada Gazette Part II, Vol.139, No.4

P.C. 2005-139 February 8, 2005

Whereas, pursuant to subsection 13(2) of the *Radiation Emitting Devices Act*, a copy of the proposed *Regulations Amending the Radiation Emitting Devices Regulations (Tanning Equipment)*, substantially in the annexed form, was published in the *Canada Gazette*, Part I, on March 13, 2004 and a reasonable opportunity was thereby afforded to manufacturers, importers, distributors and other interested persons to make representations to the Minister of Health with respect to the proposed Regulations;

Therefore, Her Excellency the Governor General in Council, on the recommendation of the Minister of Health, pursuant to subsection 13(1) of the *Radiation Emitting Devices Act*, hereby makes the annexed *Regulations Amending the Radiation Emitting Devices Regulations (Tanning Equipment)*.

REGULATIONS AMENDING THE RADIATION EMITTING DEVICES REGULATIONS (TANNING EQUIPMENT)

AMENDMENTS

1. Item 11 of Schedule I to the *Radiation Emitting Devices Regulations* [CRC, c.1370] is replaced by the following:
 11. Tanning equipment as defined in section 1 of Part XI of Schedule II.
2. Part XI of Schedule II to the Regulations is replaced by the following:

PART XI TANNING EQUIPMENT

Interpretation

1. The following definitions apply in this Part:
 - "**double-contact medium screw lampholder**" means a lampholder described in *American National Standard for Lampholders for Electric Lamps*, ANSI C81.62-1991, Standard Sheet 2-158-1, entitled *Double-Contact Medium Screw Lampholder*, published by the American National Standards Institute and approved on July 15, 1991. (*douille à contact double pour vis moyenne*)
 - "**erythema reference action spectrum**" means the erythema action spectrum set out in section 5.2 of CIE Standard CIE S 007/E-1998 entitled *Erythema Reference Action Spectrum and Standard Erythema Dose*, published in 1998 by the Commission internationale de l'éclairage. (*spectre d'action érythémale de référence*)

"**exposure position**" means any place, orientation or distance relative to the ultraviolet-radiating surface of tanning equipment at which it is recommended by the manufacturer that the user be exposed. (*position pendant l'exposition*)

"**exposure schedule**" means a program of exposure recommended by the manufacturer of tanning equipment that takes into account exposure times, intervals between exposures and the degree of sensitivity for each skin type. (*programme d'expositions*)

"**irradiance**" means radiant power incident per unit area, expressed in watts per square metre (W/m^2). (*éclairage énergétique*)

"**maximum exposure time**" means the longest period for continuous exposure recommended by the manufacturer of tanning equipment. (*durée maximale d'exposition*)

"**protective eyewear**" means a device that is worn by the user of tanning equipment to reduce the ultraviolet radiation reaching their eyes either directly or indirectly. (*dispositif de protection des yeux*)

"**single-contact medium screw lampholder**" means a lampholder described in *American National Standard for Lampholders for Electric Lamps*, ANSI C81.62-1991, Standard Sheet 2-157-1, entitled *Single-Contact Medium Screw Lampholder*, published by the American National Standards Institute and approved on July 15, 1991. (*douille à contact unique pour vis moyenne*)

"**spectral irradiance**" means the irradiance that results from radiation within an infinitesimally small wavelength range, expressed in watts per square metre per nanometre ($W/m^2/nm$). (*éclairage énergétique spectral*)

"**spectral transmittance**" means the ratio of the spectral irradiance that is transmitted through protective eyewear to the spectral irradiance that is incident and normal to the surface of the eyewear. (*transmittance spectrale*)

"**tanning equipment**" means a device that

- (a) can be equipped with one or more ultraviolet lamps; and
- (b) induces skin tanning or other cosmetic effects.

It does not include any such device that is used in the production of therapeutic effects for medical purposes. (*appareil de bronzage*)

"**timer**" means a device that is capable of ending the emission of ultraviolet radiation from tanning equipment after a preset period. (*minuterie*)

"**ultraviolet lamp**" means a device that produces ultraviolet radiation in the wavelength range from 200 nm to 400 nm and is used in tanning equipment. (*lampe à rayonnements ultraviolets*)

"**wavelength**" means a wavelength as measured in air. (*longueur d'onde*)

INFORMATION AND LABELLING

General

2. The information and labels required by this Part must be provided in both official languages.

Information

3. The following information must accompany each piece of tanning equipment:
 - (a) instructions for its operation and safe use that include
 - (i) detailed directions for determining the exposure positions,
 - (ii) the maximum exposure time,
 - (iii) the minimum interval between consecutive exposures recommended by the manufacturer,
 - (iv) the maximum number of persons who may, at the same time, be exposed to ultraviolet radiation from the tanning equipment, as recommended by the manufacturer, and
 - (v) the ultraviolet radiation warning labels described in section 5;
 - (b) instructions for obtaining repairs and the recommended replacement components and accessories that comply with the requirements of these Regulations; and
 - (c) a warning to always follow the instructions that accompany the equipment so as to avoid injury.

Labelling

4. Every piece of tanning equipment must have permanently affixed to its external surface the following information, clearly legible and readily accessible to view by the user immediately before use:
 - (a) the manufacturer's name and address;
 - (b) the model designation, serial number and month and year of manufacture;
 - (c) detailed directions for determining the exposure positions and a warning that the use of any other position may result in overexposure;
 - (d) the recommended exposure time, as calculated in seconds using the formula

$$X / (\sum V_{\lambda} R_{\lambda})$$

and converted into and expressed in minutes, where

X is a dose not greater than 100 J/m² for the first exposure session for untanned skin, gradually increasing over the following sessions to a maximum of 625 J/m² per session,

λ is the wavelength in nanometers,

R_{λ} is the irradiance of the tanning equipment, measured at the minimum exposure distance, and

V_{λ} is the weighting factor determined in accordance with the erythema reference action spectrum;

- (e) the minimum interval between consecutive exposures;
 - (f) the maximum number of minutes of exposure per year, as recommended by the manufacturer based on a maximum annual dose of 15 kJ/m², weighted in accordance with the erythema reference action spectrum and taking into account the recommended exposure schedule;
 - (g) the model designation for each type of ultraviolet lamp that is to be used in the tanning equipment; and
 - (h) the ultraviolet radiation warning labels designed in accordance with section 5.
5. The ultraviolet radiation warning labels must
- (a) be reproduced from the electronic file provided by the Minister;
 - (b) include in the French version of the label illustrated in Figure 1 of paragraph (e), enclosed within a black border,
 - (i) in the upper portion, on a white background, the signal word "Danger" in red with the hazard symbol to its right,
 - (ii) in the middle portion, the primary hazard statement "Rayonnements ultraviolets" in yellow on a black background, and
 - (iii) in the lower portion, the following message in black on a white background:

"La surexposition provoque des brûlures aux yeux et à la peau. Porter le dispositif de protection des yeux. Suivre les instructions. Médicaments et cosmétiques peuvent augmenter les effets des UV. L'exposition aux UV peut avoir des effets nocifs sur la santé et contribuer, à long terme, au vieillissement prématuré et au cancer de la peau. Ces effets sont cumulatifs. Plus l'exposition régulière commence tôt, plus les risques qui y sont associés sont élevés.";
 - (c) include in the English version of the label illustrated in Figure 2 of paragraph (e), enclosed within a black border,
 - (i) in the upper portion, on a white background, the signal word "Danger" in red with the hazard symbol to its right,
 - (ii) in the middle portion, the primary hazard statement "Ultraviolet Radiation" in yellow on a black background, and
 - (iii) in the lower portion, the following message in black on a white background:

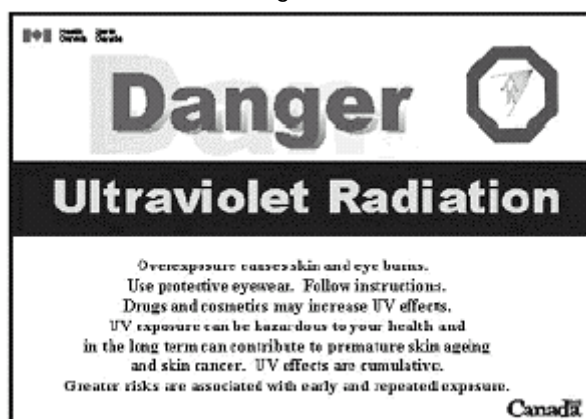
"Overexposure causes skin and eye burns. Use protective eyewear. Follow instructions. Drugs and cosmetics may increase UV effects. UV exposure can be hazardous to your health and in the long term can contribute to premature skin ageing and skin cancer. UV effects are cumulative. Greater risks are associated with early and repeated exposure.";
 - (d) measure
 - (i) 75 mm high and 200 mm wide, in the case of tanning equipment used for full- or half-body exposure, and
 - (ii) 50 mm high and 100 mm wide, in any other case; and

(e) conform to the following diagrams:

Figure 1



Figure 2



6. (1) Subject to subsection (2), all advertising material in relation to tanning equipment must include, in a clearly legible manner, the signal word "Danger", the primary hazard statements "Ultraviolet Radiation / Rayonnements ultraviolets" and the messages set out in subparagraphs 5(b)(iii) and (c)(iii).
- (2) Advertising material that is in only English or French must include, in a clearly legible manner,
 - (a) if it is only in French, the signal word "Danger", the primary hazard statement "Rayonnements ultraviolets" and the message set out in subparagraph 5(b)(iii); and
 - (b) if it is only in English, the signal word "Danger", the primary hazard statement "Ultraviolet Radiation" and the message set out in subparagraph 5(c)(iii).
7. Every ultraviolet lamp must have a tag, tape or card affixed to it that sets out
 - (a) its model designation; and
 - (b) the warning "DANGER — Ultraviolet radiation. Follow instructions. Use only in fixtures equipped with a timer. / DANGER — Rayonnements ultraviolets. Suivre les instructions. À n'utiliser qu'avec un dispositif pourvu d'une minuterie".

CONSTRUCTION STANDARDS

General

8. All controls, meters, lights or other indicators of a piece of tanning equipment must be readily identifiable and clearly labelled to indicate their function.

Safety Features

9. Every piece of tanning equipment must have the following safety features:
 - (a) a control by which the person being exposed may easily turn off the tanning equipment at any time without disconnecting the electrical plug or removing the ultraviolet lamps; and
 - (b) a timer that meets the functioning standards set out in section 16.
10. (1) Every piece of tanning equipment must have a physical barrier between the ultraviolet lamps and the user that prevents any direct physical contact between the user and the lamps.
 - (2) In the case of tanning beds, the physical barrier must be constructed of plexiglass or an equivalent material.

Components and Accessories

11. Every ultraviolet lamp that is used in tanning equipment must be constructed so that it cannot be inserted and operated in a single-contact medium screw lampholder or a double-contact medium screw lampholder.
12. Every piece of tanning equipment must be accompanied by a number of sets of protective eyewear at least equal to the maximum number of persons who may, at the same time, be exposed to ultraviolet radiation from the tanning equipment, as recommended by the manufacturer of the equipment.

Functioning Standards

13. Every piece of tanning equipment, whether it has its original components or replacement components recommended by the manufacturer, must, under the conditions of use specified by the manufacturer, meet the functioning standards set out in this Part.
14. Every ultraviolet lamp that is used in tanning equipment must function so that, at any distance and in any direction from the radiation source, the irradiance within the wavelength range from 200 nm to less than 260 nm does not exceed 0.003 of the irradiance within the wavelength range from 260 nm to 320 nm.
15. Every replacement ultraviolet lamp must function so that the maximum exposure time remains within 10% of the maximum exposure time originally recommended by the manufacturer.

16. The timer must
 - (a) be adjustable to preset times and have a maximum timer setting not greater than the maximum exposure time recommended by the manufacturer;
 - (b) have a margin of error not greater than 10% of the maximum timer setting; and
 - (c) not automatically reset when the tanning equipment emissions have been ended by the timer.
17. Protective eyewear must have a spectral transmittance that is
 - (a) not more than 0.001 over the wavelength range from 200 nm to 320 nm;
 - (b) not more than 0.01 over the wavelength range from 320 nm to 400 nm; and
 - (c) sufficient over wavelengths greater than 400 nm to enable the user to read the labels and use the control specified in paragraph 9(a).

COMING INTO FORCE

3. These Regulations come into force on the day on which they are registered.

TANNING OPERATOR KNOWLEDGE QUESTIONNAIRE

The owner or manager of the facility should ensure that each operator completes the questionnaire on the following two pages to evaluate their knowledge about UV radiation. (Please photocopy.)

It is recommended that the owner or manager retain copies of the completed questionnaire for review by Environmental Health Officers. It is also recommended that operators not be permitted to work with clients until they can answer all of the questions in the questionnaire correctly.

TANNING OPERATOR KNOWLEDGE QUESTIONNAIRE

Operator's name: _____ Date completed: _____

- 1. Name the three wavelength regions that ultraviolet radiation may be divided into. _____
- 2. Which of these three wavelength regions of ultraviolet radiation are now most prevalent in commercial tanning equipment emissions? _____
- 3. What is the correct term for skin reddening or sunburn? _____
- 4. Briefly, what is the skin's reaction that causes erythema? _____
- 5. Of UVA and UVB, which penetrates most deeply into the layers of the skin? _____
- 6. Of UVA and UVB, which is responsible for long term or long lasting tans? _____
- 7. List one painful eye injury resulting from ultraviolet radiation exposure to the unprotected eye. _____
- 8. List two common categories of drugs or medications which may increase sensitivity to ultraviolet exposure. _____
- 9. The sun produces about 2.5 mW/cm² of UVA in summer around noon in BC. How much UVA does a typical tanning bed produce? _____

True or False

- 10. Most conventional commercial tanning devices emit some UVB radiation.
 True False
- 11. The risk of developing skin cancer will increase as total ultraviolet exposure is increased.
 True False
- 12. Cataracts can be a long term chronic effect of ultraviolet radiation exposure of unprotected eyes.
 True False

13. After using a commercial tanning facility, if a customer complains of red irritated and watering eyes, or an itching skin rash causing discomfort, the customer should be told that the cause may be related to ultraviolet exposure.
 True False
14. The customer doesn't have to wear protective eye-wear while using a tanning device at a commercial tanning facility if he or she doesn't want to.
 True False
15. A fair-skinned person with red or blond hair and freckles should be allowed to use a tanning unit for as long as a dark haired, dark skinned, brown eyed individual.
 True False
16. Ultraviolet radiation is responsible for premature skin aging effects such as wrinkling and skin hardening.
 True False
17. UVA radiation exposure causes the skin to produce more melanin producing cells, thus creating a longer lasting tan.
 True False
18. It is the customer's responsibility to ask the owner or operator for instructions on the proper use of tanning equipment.
 True False

Results: Correct Answers _____ Incorrect Answers _____

Comments:

Owner's or manager's signature

Date

TANNING OPERATOR KNOWLEDGE ANSWER KEY

Core Questions

1. UVA, UVB and UVC are the three ultraviolet radiation wavelength regions.
2. UVA and UVB: Commercial tanning equipment all emit primarily UVA radiation, with either a small amount of UVB or else UVA with a considerable amount of UVB.
3. Erythema is the medical term for inflammatory redness of the skin. It can be produced by exposure to UV Radiation. When this happens, Erythema is commonly called "sunburn".
4. Erythema occurs when the small blood vessels in the skin dilate and increase the flow of blood to the skin's surface.
5. UVA is the wavelength which penetrates most deeply into the skin.
6. UVB causes long lasting tans by increasing the production of the melanin pigment in the skin.
7. Photokeratitis or photoconjunctivitis (also known as welder's flash or snow blindness) are two painful eye injuries that can result from exposure of unprotected eyes to UVR.
8. Antibiotics, blood pressure and heart medications, and birth control pills are some of the common classes of drugs which can increase the skin's sensitivity to UVR. (See Appendix D for full list).
9. Tanning beds typically produce between 7 to 20 m/W cm² of UVA, which is as much as three to eight times the UVA the sun produces at noon in BC in the summer. Some newer, non-fluorescent technology tanning beds can emit more than 60 m/W cm² – which is 25 times more than the UVA produced by the sun at midday.

True or False

10. True
All tanning lamps emit some UVB radiation, the form of ultraviolet radiation with the greatest capability of causing sunburns. All operators *must* be aware of the maximum exposure times for their clients, depending on their skin type and the intensity of the lamps used in their tanning equipment.
11. True
The risk of developing skin cancer increases as total exposure to ultraviolet rays increases.

12. **True**
Ultraviolet radiation exposure to unprotected eyes can cause cataracts, photokeratitis and other painful eye injuries.
13. **True**
Operators should tell customers that exposure to ultraviolet radiation at a tanning salon can cause watering eyes, an itching skin rash or sunburn.
14. **False**
All customers *must* wear protective eye-wear while using tanning equipment.
15. **False**
Fair-skinned people with red or blond hair and freckles should not use a tanning device for as long as people with dark hair, dark skin and brown eyes. Fair-skinned people are most at risk of burning and skin cancer. Children, the elderly and those who always burn or don't tan well should not use tanning units at all.
16. **True**
Ultraviolet radiation causes premature skin aging effects such as wrinkling and hardening.
17. **False**
Although UVA radiation penetrates more deeply into the skin, it is mainly the UVB exposure that causes the skin to produce more melanin, creating a long lasting tan. UVB radiation is 1,000 times more likely to cause sunburn than the same intensity of UVA radiation.
18. **False**
Operators must provide customers with clear instructions on how to use tanning equipment, including maximum exposure times (based on their skin type) and the need to wear protective eye wear while tanning.