



Lighting for Captive Reptiles: A Practical Guide

Proper lighting is one of the most critical — and often misunderstood — aspects of reptile husbandry. Light affects thermoregulation, vitamin D3 synthesis, circadian rhythms, visual perception, and overall behavioural health. A well-structured lighting plan should provide a spectrum of light that mimics the reptile’s natural environment (in other words ‘the sun’), including **UVB, UVA, infrared (heat), and visible light**.

Here we’ll look at the background to our lighting choices and Section 5 gives our suggestions on how best to provide the most appropriate lighting for your reptile. Remember that vision, and therefore the light we provide, is one of the main ways a reptile can perceive its environment and everything in it.

1. Ultraviolet Light (UVA and UVB)

◆ UVB – Ultraviolet B (290–320 nm)

- Essential for **vitamin D3 synthesis**, which allows proper calcium metabolism.
- Deficiency leads to **metabolic bone disease**, poor immune function, and reproductive issues.
- UVB output is measured using a **Solarmeter 6.5**, which gives a **UVI (Ultraviolet Index)** reading.
- Use the **Ferguson Zone model** to guide UVI requirements:

Ferguson Zone	UVI Range	Typical Species
Zone 1	0–0.7. (Maximum UVI: 0.6 – 1.4 in basking zone)	Crepuscular/gecko species (e.g., leopard geckos)
Zone 2	0.7–1.0. (Maximum UVI: 1.1 – 3.0 in basking zone)	Semi-shaded species (e.g., corn snakes)
Zone 3	1.0–2.6. (Maximum UVI: 2.9 – 7.4 in basking zone)	Partial sun baskers (e.g., bearded dragons, Mediterranean tortoises)
Zone 4	2.6–3.5+. (Maximum UVI: 4.5 – 9.5 in basking zone)	Full sun baskers (e.g., uromastyx, chuckwallas)

- **Tips:**
 - Always provide a **UV gradient** so reptiles can self-regulate.
 - Replace UV bulbs every 6–12 months (check manufacturer’s guidance).
 - Measure UVI at the basking zone with Solarmeter 6.5 to avoid over- or underexposure. **See 6 Monitoring and Maintenance.**

UVA – Ultraviolet A (320–400 nm)



- Vital for **reptile vision**, social behaviour, and appetite stimulation.
 - Many reptiles can see UVA light, and its absence may impair natural behaviours.
 - Most modern UVB bulbs also emit UVA, but dedicated UVA LED strips are available for enhanced enrichment.
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2. Infrared Radiation-A (IRA/Near Infrared)

- IRA provides the **heat** necessary for thermoregulation.
- Reptiles are ectothermic and require an external heat source to maintain metabolism and digestion.
- Use **infrared (near-IR) emitters such as deep heat projectors or halogen basking bulbs** to provide:
 - A **basking hotspot** in the correct temperature range (species-dependent).
 - A **thermal gradient** within the enclosure.
 - **Near –IR** penetrates deeper through the skin and into deeper tissues and is more biologically active.

Important: Use a **digital thermostat** and **infrared thermometer or temperature gun** to maintain safe, stable temperatures. A temperature gun allows one to map out your reptile's thermal environment accurately. Try to place the temperature probe of the thermostat as close to the basking area as you can. The basking temperature is most the important parameter – it should be the highest temperature in the vivarium and any temperature gradients follow on from that basking temperature. Always calibrate the temperature you have set the thermostat at, using your temperature gun, as the temperature you set your thermostat at may not be the actual temperature experienced at the basking spot.

Deep heat projectors do not produce any visible light and so are suitable for heating during the day or night, and will not interfere with your reptile's day/night cycle. In contrast a halogen light will emit some light and is therefore only suitable for daytime warming.

Ceramic heaters and heat mats produce far infrared, which is minimally produced by the sun and hardly penetrates the skin and so is less useful to the reptile.

3. Visual Light (Visible Spectrum / LED)

- Daylight-quality light supports **circadian rhythm** and behavioural health.
 - Many reptiles are **tetrachromatic** and can see wavelengths beyond human perception, including UVA.
 - Use **high-CRI (Colour Rendering Index) LED or fluorescent lights** to simulate natural daylight.
 - Position bright white light across the photoperiod (10–14 hours depending on season and species).
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4. Lighting Schedule and Photoperiod

- Match the **photoperiod** to the species' natural habitat and season:
 - **Equatorial species:** 12h light / 12h dark year-round.
 - **Temperate species:** Seasonal variation in light cycle and intensity.
 - Use **timers** to automate lighting and reduce stress.
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5. Practical Lighting Setup

- Combine the three different types of lighting to give your reptile optimum lighting:
 - **UVB tube** (e.g., T5 HO linear bulb with reflector) for UV.
 - **Halogen bulb** for basking and IR.
 - **Daylight LED** strip or lamp for full-spectrum visible light.
 - Make sure that the UV light area coverage includes that of the basking spot. Reptiles bask primarily for warmth and would naturally be exposed to UV light whilst doing so in the wild. Having UV lighting and heat at opposite ends of the vivarium means that the reptile needs to make a choice and in almost all cases it will select heat at the expense of missing out on UV exposure. LED lighting should light up as much of the vivarium as possible.
 - Mount UVB at the correct distance to achieve target **UVI**:
 - Adjust based on fixture height and strength (e.g., T5 HO 12% may give UVI 3.0 at 30 cm). Preferably use a **solarmeter 6.5** to assess height that gives correct UVI; alternatively some sites like Arcadia (<https://arcadiareptile.com/lighting/>) do give recommended height suggestions. Measure UVI to where the top of the basking animal will be. Take account of 'odd' shapes such as the high casque of male Yemen (veiled) chameleons so that these extremities are not exposed to too high UVI as burns can occur.
 - Never place UV lighting above or through glass or acrylic — it blocks UVB.
 - Lighting through mesh will significantly reduce the amount of light transmitted into the vivarium.
 - Never mount a UV light on the back or side of a vivarium, as the light may be able to bypass a reptile's protective eyebrows and cause direct damage to the eye.
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6. Monitoring and Maintenance

- Use an infrared gun to monitor temperatures within the vivarium.
 - Use **Solarmeter 6.5** weekly to verify UVI in basking zones.
 - Monitor bulb ageing (use the **Solarmeter 6.5**) and enclosure layout changes that affect exposure.
 - Clean bulbs and reflectors to maintain efficiency (avoid harsh chemicals).
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Conclusion.



Lighting must be tailored to each species' ecological niche. A **thoughtfully constructed lighting system** can greatly enhance the welfare of captive reptiles, supporting **natural behaviours, metabolic health, and psychological wellbeing.**

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