XTYLOS Q&As

1. Q: How do you pronounce ‘XTYLOS’?

A: Say “Steelows”.

2. Q: What is special about the XTYLOS?

A: The Claypaky XTYLOS is the world’s first laser-based beam lighting fixture. It incorporates a very efficient light generation and mixing system.

3. Q: Which part is the ‘laser’?

A: In the XTYLOS, the HMI discharge lamp is replaced with Red, Green and Blue solid-state diode lasers. Using RGB laser diodes as the light source has several radical advantages over other lamp technologies. ‘Laser diodes’ are a cousin of traditional LEDs, but can generate much more directional light than LEDs making the laser diode suitable for collimated beam effects.

4. Q: What are the benefits of XTYLOS?

A: XTYLOS combines the benefits of Lamps and LEDs into a single fixture:

- Exceptionally collimated beam
- Instant color changing
- Additive color mixing
- Highly efficient
- Minimal heat generation
- Ultra long-life light source
- Compact and lightweight
- Superior Pan/Tilt speed
- & more!

5. Q: Is the XTYLOS hazardous?

A: No more than other lights. The XTYLOS generates a radiance level which is about the same as other existing entertainment fixtures which have been used safely for decades. Most entertainment lighting fixtures are bright and should not be directly exposed to human eyes at close distances. The same is true for the XTYLOS. But the XTYLOS does not possess a laser-like hazard.
As a further matter of comparison, at full RGB power, the XTYLOS produces a few thousand lumens in output. This is approximately 50% of the output from equivalent lamp-based fixtures like the popular Claypaky Sharpy and less than 10% of the lumen output of a larger equivalent LED-based fixture.

Like any product, safety depends on the user and that the product is used correctly. Even though the XTYLOS produces less radiance and lumen output than similar lamp/LED based fixtures presently on the market, the XTYLOS takes safety to a new level by introducing and embedding a set of safety features that ensures its safe usage in show environments by any operator.

6. Q: Is XTYLOS like a conventional entertainment laser light show projector?

A: No, not at all. Referring to radiance as the major parameter defining ocular-hazard from a light source, XTYLOS has a radiance value 50,000 times lower than a typical laser light show projector.

The XTYLOS light output is about 14 centimeters in diameter at the aperture with more than one degree of divergence. A typical laser light show projector has a beam diameter <3 millimeters diameter and less than 0.1 degree divergence. In other words, the XTYLOS beam is nothing like the beam from a traditional entertainment laser.

For this reason, the XTYLOS can be used to illuminate the audience or performers at shorter distances than typical laser light show projector. Depending on the operating mode, the XTYLOS can be safely shined at the audience at 25 meters – and this limitation is not due to the properties of the laser engine, but simply due to the brightness of the beam at this distance. Indeed, at reduced power, throw distances to audience can be closer.

7. Q: Isn't there something magic about lasers that inherently make them dangerous?

A: No! Although this is a common misperception. The hazard from any light source comes simply from its radiance level. Traditional scanned laser beam and graphics effects use lasers with extremely high radiance levels (due to very thin and concentrated beams). The XTYLOS generates a much lower radiance which is about the same as most entertainment lighting fixtures and less than many others on the market today.

8. Q: What is 'Radiance' and why do I care?

A: Radiance is a complex measurement of the property of how light propagates.

It defines how much optical power can be collimated from a light source of a certain size and focused into a spot of a smaller size. In this case, how much light can be focused by the pupil/lens in our eyes onto our retina.

The potential damage to the eye from any light source is directly related to the actual 'radiance' of the light source. XTYLOS has been engineered in a way that laser diode output radiance is lowered to a level compliant with safety regulation for being classified as Class 1 / RG3.

9. Q: Isn't the XTYLOS really a Class 4 laser?

A: No! The XTYLOS is recognized by the international IEC 60825-1 (2014, part 4.4) safety standard as "a laser being used as a conventional lamp source". XTYLOS emission is evaluated under the IEC 62471 series of standards known as "Photobiological Safety of Lamps and Lamp Systems".

This recently updated safety standard understands that products that mimic lamp sources and have low radiance have no more hazard than the lamps they replace. This special safety category defines the XTYLOS as 'Class 1 / RG3'. Class 1 is the lowest (safest) laser safety category, while 'RG3' is the highest 'lamp safety' category.

Another area of laser illuminated products which are in broad use today in entertainment and are also recognized as 'Class 1 / RG3' are Laser Video Projectors (aka 'LIP's: Laser Illuminated Projectors').

10. Q: Why is XTYLOS declared "Laser Class 1", if it is classified according to Lamp Safety Standard?

Various current entertainment lighting fixtures are classified as RG3 under the lamp safety standards. The intent of part 4.4 of the 60825-1 safety standard is to clarify that XTYLOS doesn't represent laser-like hazards and therefore should not be classified like lasers. Therefore, they are assigned a risk group (RG) like lamps.

Nevertheless, the regulation requires that Claypaky inform XTYLOS users that a laser is contained in it, and thus Laser Class 1 must be declared.

More specifically, since the XTYLOS contains high brightness lasers, special service procedures are used when the fixture must be opened to prevent human access to ocular risks during service procedures. Even so, the XTYLOS is engineered such that even during service procedures, only the radiance of a common laser pointer (Class IIIa / 3R) is accessible, eliminating the need for extensive safety controls and procedures.

11. Q: Can I get a second opinion?

A. The Claypaky XTYLOS was developed in close cooperation with the global laser safety experts and authors of the IEC 60825-1 safety standard to ensure full compliance around the world. The safety and Class 1 / RG 3 designation has also been confirmed by internationally certified testing laboratories.

12. Q: Is Xtylos already used around the world?

A: Yes, Claypaky has various customers in Europe, South Africa, Japan or Australia who are already using the XTYLOS to great success.

13. Q: Can the XTYLOS be used in the United States?

A: Yes! But a variance is needed. The US is the only country to require special paperwork. All other countries recognize the Class 1 / RG3 rating as being as safe as other lights and require nothing additional in the way of user requirements.

In the US, Claypaky's customers must obtain a variance issued by FDA CDRH. Claypaky will assist XTYLOS customers in obtaining a variance through its simple web portal.

14. Q: What is a variance?

A: A variance is simply a permit from the US FDA CDRH. It allows use of the XTYLOS for show production until such a time that the US Congress updates the regulations governing laser use for entertainment.

This permit is free and is granted by the FDA, upon request through Claypaky's simple training and variance application web portal.

15. Q: What is the FDA CDRH?

A: 'United States Food and Drug Administration' - 'Center for Devices and Radiological Health'. A U.S. Government Agency.

16. Q: Why is the US Food and Drug Administration involved in entertainment lighting?

A: The US FDA ensures the safety of medical products such as X Ray machines, and even consumer products such as microwave ovens. When the laser was invented many years ago, the FDA was the agency with expertise in electronic product safety, so it was chosen to regulate these specialty devices.

17. Q: If the XTYLOS is as safe as other lights, why does the US government regulate them?

A: Claypaky innovates quickly to bring you the latest possible technology in lighting. We feel that it is important to get these industry-changing innovations to the uses as quickly as possible. And in the case of XTYLOS, we feel that the benefits of the fixture were so substantial that users would respect the technicalities of the law and obtain a variance in order to operate the fixtures safely and legally.

The light show lasers that have been around for decades have ultra high radiance and carry a potential hazard for eye exposure even at very long distances. The US government began regulating entertainment lasers in 1979.

No one could imagine the XTYLOS technology when those regulations were written. Those decades-old regulations didn't make distinctions between high-radiance scanning 'beam' laser products and the

brand new, low-radiance XTYLOS concept. So, to bring you the great benefits of XTYLOS today, there is still paperwork and training associated with XTYLOS use now at the introduction of this great new technology.

Again, we feel the benefits of XTYLOS far outweigh any extra effort in obtaining a variance to use the products. We all want to operate our shows in the safest manner possible, so, at least for now, it's important for XTYLOS users to pursue the variance – and Claypaky has made the variance application process very simple and easy.

18. Q: Is the FDA variance needed outside the United States?

A: No. The variance and related requirements are specific only to the US.
However, international tours which have performances in US require a variance.

19. Q: How do I obtain the FDA variance?

Claypaky will support its customers in using the XTYLOS in the United States.

In order to simplify the training and variance application process, Claypaky has created a system of tools that quickly walk the user through the process:

- Dedicated Web Portal
- Automated Variance Application:
  - on-line training
  - automated variance form generation and on-line application submittal
  - support in interacting with FDA until variance approval