安全时刻

HSE HKUST(GZ)

NO. 015
2024年6月15日

激光安全（Ⅰ）

激光的全称是受激辐射光放大。激光器是一种高度准直的极强单色电磁辐射源。

根据《激光产品的安全 第1部分：设备分类、要求（GB 7247.1-2012)》，按照危害程度由低到高，将激光产品分为以下等级：1类、1M类、2类、2M类、3R类、3B类和4类。

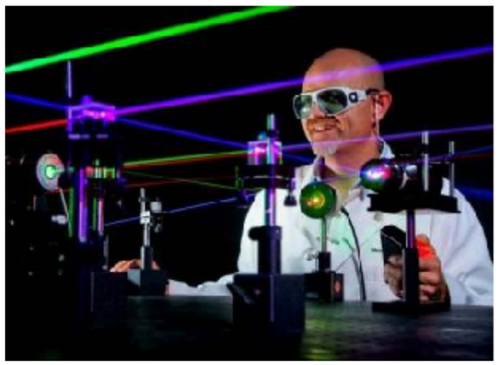
3类和4类激光产品需要向HSE报备，其采购、使用流程：确认采购需求—联系HSE登记—向有资质单位采购—编制激光危害控制计划—现场风险评估（包含SOP）—安全培训-操作。

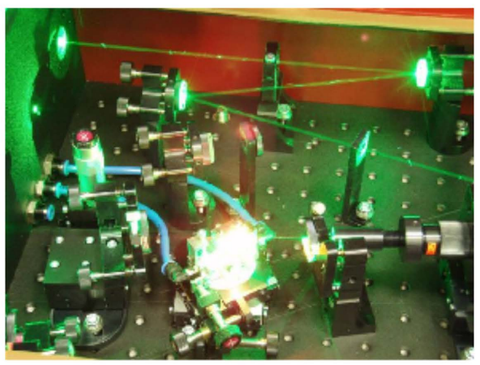
激光等级	功率	危险性	激光产品举例
1类激光	μW	即使长时间用肉眼也是安全的	激光打印机
2类激光	0.1-1 mW	短时间内肉眼接触是安全的，但激光束的故意凝视可能有害。	游戏用激光枪、激光棒及条码扫描器
3R类激光	1-5 mW	如果直接看到或者通过光学器件看到光束，就可能对人眼造成伤害	激光棒,直线校准仪器,激光粒度仪
3B类激光	5-500 mW	直接或者瞬时暴露在激光束前都将对眼睛或皮肤造成伤害	用于物理治疗的激光治疗仪，激光共聚焦显微镜
4类激光	0.5 W以上	不仅直接或者瞬时暴露在激光束前会损伤眼睛和皮肤，被激光束的杂散光、反射光照到也会损伤眼睛和皮肤。还有潜在的火灾隐患	光纤激光切割机、飞秒激光器

国内外标准

1. 国际电工委员会（IEC)：制定和管理国际激光安全标准， IEC 60825-1, 2007
2. 激光产品的辐射安全：GB7247.1-2012


GB
中华人民共和国国家标准
GB 7247.1—2012/IEC 60825-1:2007
激光产品的安全
第1部分：设备分类、要求
Safety of laser products—
Part 1: Equipment classification and requirements
2012-12-31 发布
2013-12-25 实施
中华人民共和国国家质量监督检验检疫总局
中国国家标准化管理委员会 发布





学校激光安全手册见https://hse.hkust-gz.edu.cn/posts/442/第十一章-激光安全/

Safety Moment

NO. 015
JUNE 15, 2024

Laser Safety(Ⅰ)

Laser: Light Amplification by Stimulated Emission of Radiation. A laser is a highly collimated source of extremely intense monochromatic electromagnetic radiation.

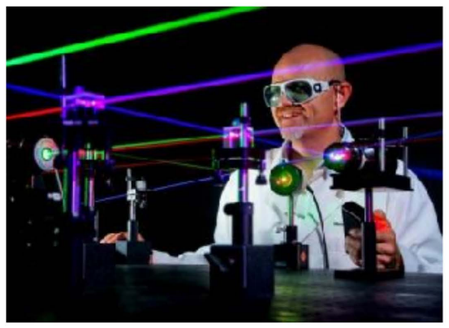
According to the "Laser product safety Part 1: Equipment classification, requirements (GB 7247.1-2012)", according to the degree of harm from low to high, laser products are divided into the following grades: Class 1, Class 1M, class 2, class 2M, class 3R, class 3B and class 4.

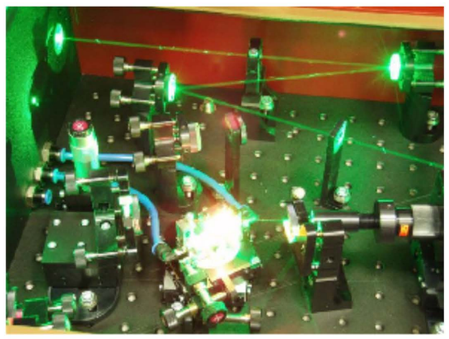
Class 3 and Class 4 laser products shall be reported to HSE and their procurement and use procedures is : confirm procurement needs - contact HSE registration- purchase from qualified suppliers - laser damage control plan - Site risk assessment (including SOP) - safety training - operation;

Class	Power	Hazard	laser products sample
class 1	μW	Under normal use, no harm	laser printer
class 2	0.1-1 mW	Be safe for instantaneous irradiation, but intentional gaze of the laser beam may be harmful	Laser guns, laser sticks and bar code scanners for games
class 3R	1-5 mW	If the light beam is seen directly or through an optical device, it can cause damage to the human eye	Laser rod, linear calibration instrument,laser particle analyzer
class 3B	5-500 mW	Direct or instantaneous exposure to the laser beam can cause eye or skin damage	Physical therapy laser, laser scanning confocal microscope
class 4	Above 0.5 W	Not only direct or instantaneous exposure to a laser beam can damage the eyes and skin, but the stray light and reflected light from the laser beam can damage the eyes and skin. There are also potential fire hazards	Fiber laser cutting machine, femtosecond laser

Domestic And Foreign Standards

1. IEC: Develops and administers the international laser safety standard, IEC 60825-1, 2007
2. Radiation safety of laser products: GB7247.1-2012





The school Laser Safety handbook is available at https://hse.hkust-gz.edu.cn/posts/442/ 第十一章-激光安全/