

Laser equipment produces extremely intensive radiation, which is concentrated into a high energy density by optical systems. The energy density is only slightly reduced even at long range. If laser radiation strikes the human eye, this can cause irreparable damage to the retina.

The following instructions must therefore be observed when setting up laser equipment at trade fairs, exhibitions and shows:

1. Only lasers that transmit **visible light** (wavelength 400 to 700 nm) may be used. The output power must be limited to the extent essential for the purpose.
2. Laser equipment must be assigned to a class (1-4) in accordance with DIN EN 60825-1 and marked accordingly.

Class 1 Safe for the human eye. Max. output power: 0.39 – 69 W depending on wavelength of radiation 0.39 – 69 W

Class 2 Safe for the human eye for short periods of exposure to radiation of max. 0.25 s (blink reflex).
Max. output power 1 mW

Class 3A Safe for the human eye for short periods of exposure to radiation of max. 0.25 s (blink reflex).
Dangerous if optical instruments are used to concentrate the beam.
Max. output power 5 mW, light power density 25 W/m²

Class 3B Dangerous for the human eye and in special cases for the skin.
Max. output power 0.5 W

Class 4 Very dangerous for the human eye and dangerous for the skin. There is also a **risk of fire!** (See Form P2 – Service CD)
Max. output power > 0.5 W

3. Laser systems must comply with the requirements of the Equipment Safety Act and the generally recognized rules of engineering. These particularly include the Occupational Health and Safety Regulations of the trade associations (German **BGV B2**) and the DIN standards **DIN EN 60825-1** and **DIN EN 56912 1999-04** Safety Standards and Testing. The manufacturer can prove compliance with the safety standards through a test carried out by an approved body.
4. If class **3A to 4** lasers are used, the beam must be widened by optical instruments to reduce the power density to a safe level in all areas in which people are present. Alternatively, the beam must be routed at a minimum height of 2.7 m above the floor. A laser protection officer must also be constantly present on site.
5. If individual requirements cannot be complied with, **the following protective measures shall be used.**
The laser beam shall be permanently installed so that people cannot enter the area of the beam.
Beams reflected intentionally or unintentionally from reflective surfaces (mirrors, metallic surfaces, glasses, bottles) must not be aimed at areas where people are present. If this cannot be excluded or is accepted during demonstrations, these persons must be provided with suitable tested safety goggles.
If light effects are used during shows, persons must be prevented from entering the laser projection area. This also applies to areas through which the beam is deflected by reflection equipment.
No focusing devices are to be present in the laser area.
Unintentional drifting or deflection of the beam must be prevented by non-combustible barriers.
6. Laser systems must be shielded to ensure that only the useful beam can be transmitted.
7. Laser equipment must be set up in a firm position and secured to prevent movement.

8. Optical equipment, deflection devices, scanners, etc. must be secured to prevent falling or unintentional movement. The measures implemented must comply with the relevant event equipment regulations.
9. Optical equipment intended as attachments for lasers must be marked to indicate any changes caused to the beam data if this equipment is not mounted on the laser equipment itself.
10. The adjustment of the laser system must be checked before each demonstration. If maladjustment is detected, the system must be taken out of operation immediately and repaired by a skilled person.
11. Laser systems, operator consoles and other control equipment must not be accessible for unauthorized persons and it must not be possible for such persons to start the equipment unwittingly (panic button with key).
12. The operating staff must be able to view the complete sphere of action of the laser.
13. If the laser radiation could cause an unintentional fire hazard, this must be notified to NürnbergMesse on Form P2 of the Service CD.

For more detailed information please contact:

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(continued)

Approval procedure at NürnbergMesse

Introduction

The operation of class 3B and 4 laser systems must be notified by the company in writing **to the Trade Inspectorate and the trade association**.

This notification must be submitted to the stated bodies and [NürnbergMesse](#) at least 2 weeks before taking the laser system into operation.

Please note that the responsible authority may require a test to be carried out by an expert at extra cost. NürnbergMesse may also require such a test.

The notification must contain the following information:

- Manufacturer of laser system
- Laser class (without housing)
- Laser class (with housing)
- Laser radiation power
- Radiation energy
- Wavelength

Additional information for NürnbergMesse:

- Event
- Contact
- Name of laser protection officer (class 3A and higher)
- Hall
- Stand number

For operation of a class 3B or 4 laser system, the company or exhibitor must appoint a qualified person as laser protection officer in writing and notify NürnbergMesse of this person's details.

Laser protection officers are responsible for ensuring safe operation and compliance with the protective measures. At least one officer shall be nominated as person responsible for each event and this person must supervise the operation of the laser equipment for the full duration of the event.

Persons working in the laser area (except class 1) shall be given instruction on the hazardous effect of laser beams and the necessary protective measures before commencing their work and at least yearly. Records must be kept of this instruction.

If instructed by the Trade Inspectorate or trade association, the company or exhibitor must have the laser system tested for safety by an expert before taking the system into operation.

Any defects detected by the expert must be cleared before taking the system into operation.

Laser experts

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Advice on all matters of occupational health & safety, safety engineering and accident prevention in Bavaria is obtainable from:

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Pfarrstraße 3
80538 München
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and the responsible Trade Inspectorate office:

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