



DEPARTMENT OF  
ENVIRONMENTAL  
SAFETY

# Z136.1 VS Z136.8

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# Use of Standards

- Currently using Z136.1
  - Some requirements difficult to implement in University lab environment
    - For example, remote interlock connector
- Planning to use Z136.8 as guidance document



# Z136.8: What I Like

- Additional aspects in hazard analysis
- On-the-job training
- Optical fibers
- Warning signs
- Alignment eyewear
- Visitors and spectators
  - Principal Investigator
- Good guidance
  - Diagrams
  - Audit forms



# Z136.1 VS Z136.8

- Differences can cause confusion
  - Activation warning system
  - SOP requirement
  - Alignment SOP requirement





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**Thank you!**

# Z136.1 and Z136.8 Discussion

**Z136 ANSI standards are a consensus document to provide guidance for the safe use of lasers.**

***But***

They get used as regulatory requirements:

- at DOE labs, under Rule 10CFR851
- at places subject to OSHA, under general duty clause to provide a safe work environment

# Z136.1 and Z136.8 Discussion

## **Z136.1 and Z136.8 documents include:**

- many “Shall” and “Should” statements, that get used as requirements
- lots of good guidance

## **Z136.1 and .8 have many contributors voluntarily contributing their time**

- Issues with clarity, consistency, organization of sections

# Z136.1 and Z136.8 Discussion

## Z136.8 :

- **lots of very good guidance** for R&D and Testing Environments

### Some issues with Z136.8 include:

- Alternate Controls
  - “Upon review and approval by the LSO, engineering and admin Requirements can be replaced by alternate controls.”
  - This eliminates the phrase in Z136.1, which adds “which provide equivalent protection”
- Lockout/Tagout (LOTO) capability
  - “All energy sources associated with Class 3B and Class 4 lasers should be designed to permit LOTO procedures required by OSHA”
  - In Z136.1, this is a “shall”
- FDA requirements for manufacturers
  - “Products developed and then sent offsite out of control of the developer should meet as many FLPSS requirements as possible”



## Other issues with Z136.8 include:

- Alignment eyewear (Section 4.5.2.10)
  - For CW visible lasers, alignment eyewear shall be no more than OD1 less than full protection
  - For pulsed visible lasers, alignment eyewear shall be no more than OD1.4 less than full protection
  - Above 2 statements inconsistent with 4.5.2.10.1 “LSO shall not recommend alignment OD less than point source diffuse OD requirement “ (note: this can be OD4 less than full protection)
- User Facilities (Section 4.4.2)
  - “The LSO shall be notified of any new or modified beam paths that may impact safety so that a new hazard analysis can be performed”

## **My personnel recommendations for future of .1 and .8 revisions**

- Acknowledge that the .1 document is being used for requirements
- Simplify .1 + make concise
  - requirements only
  - eliminate guidance (or move to Appendix)
- Improve clarity and consistency of .1 requirements
  - also improve organization of material
  - should make use of a professional technical editor to help
- Use .8 for guidance and don't put "shall" and "should" statements in it
  - Make use of "examples" for how to implement .1 requirements in a given environment