

NHTSA
Workshop on Headlamp Safety
Metrics

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GLARE

Discomfort — vast majority of complaints appear to be discomfort

Disabling — Industry is not aware of any evidence that demonstrates the existence of disabling glare from OEM lighting systems

Currently there is a lack of objective data that demonstrates that glare adversely affects vehicle safety

Mirrors

Methods to mitigate glare from following vehicle

Inside

Manual

Auto-dimming

Exterior

Auto-dimming

Potential causes of glare

- Misaim
 - Headlamps
 - Fog and Auxiliary lamps
- High mounting height
- Dirt
- Luminance
- Color
 - HID vs Halogen
- Aftermarket replaceable bulbs

Potential glare mitigation actions

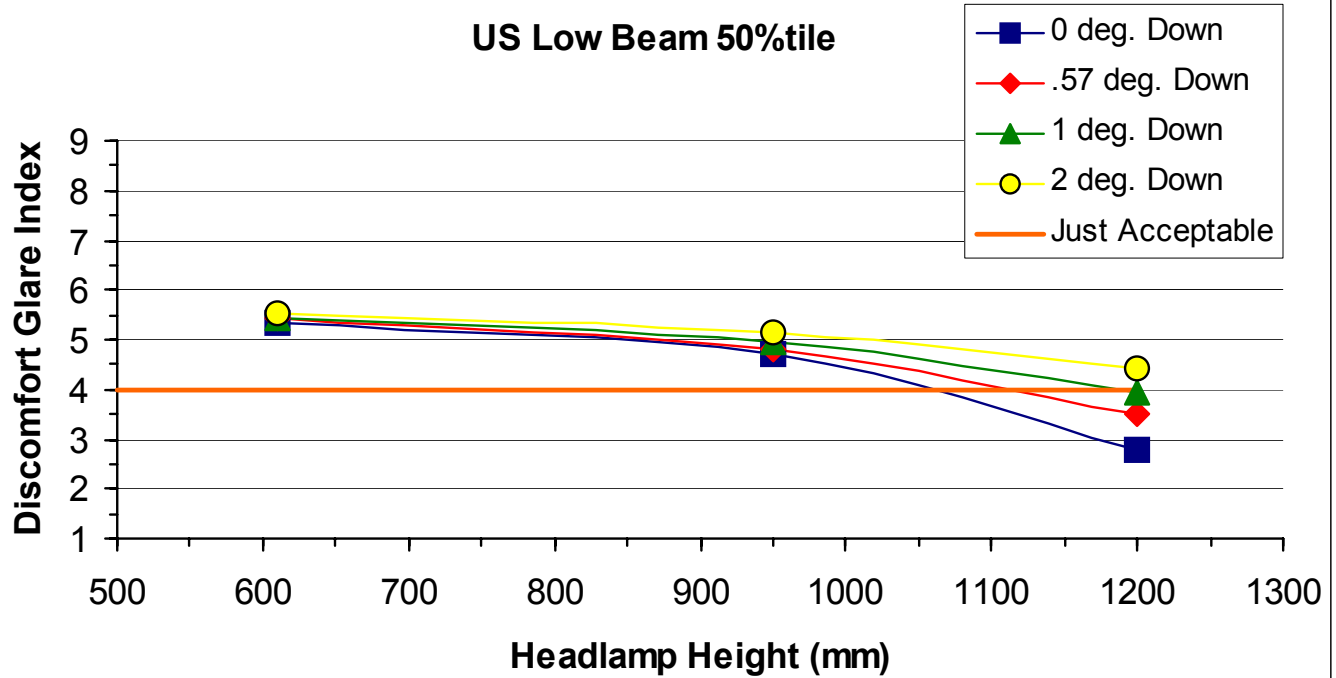
- Headlamp aim
 - Improve State enforcement
 - Leveling
 - Manual
 - Automatic
- Mounting height reduction
- Headlamp cleaners
- Revised beam pattern specifications
- Increased enforcement actions – replaceable bulbs

Safety need

Practicability - Timing

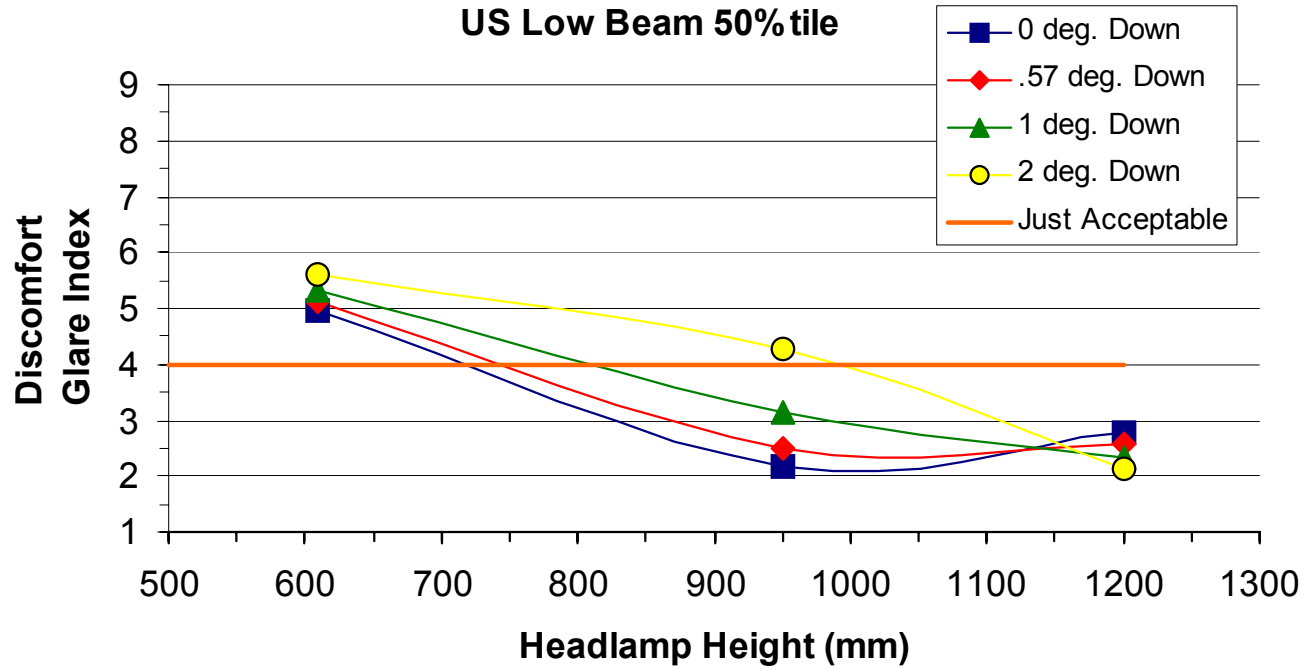
Glare on the Inside Mirror

US Low Beam 50%tile



Glare on the Outside Mirror

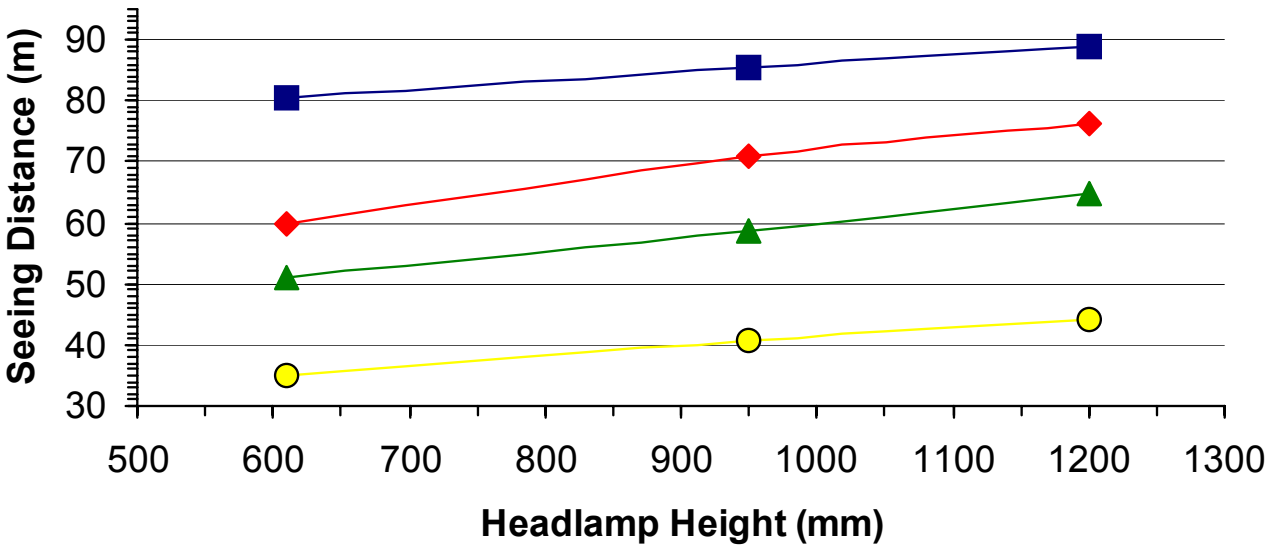
US Low Beam 50% tile



Pedestrian Seeing Distance

US low beam 50%tile

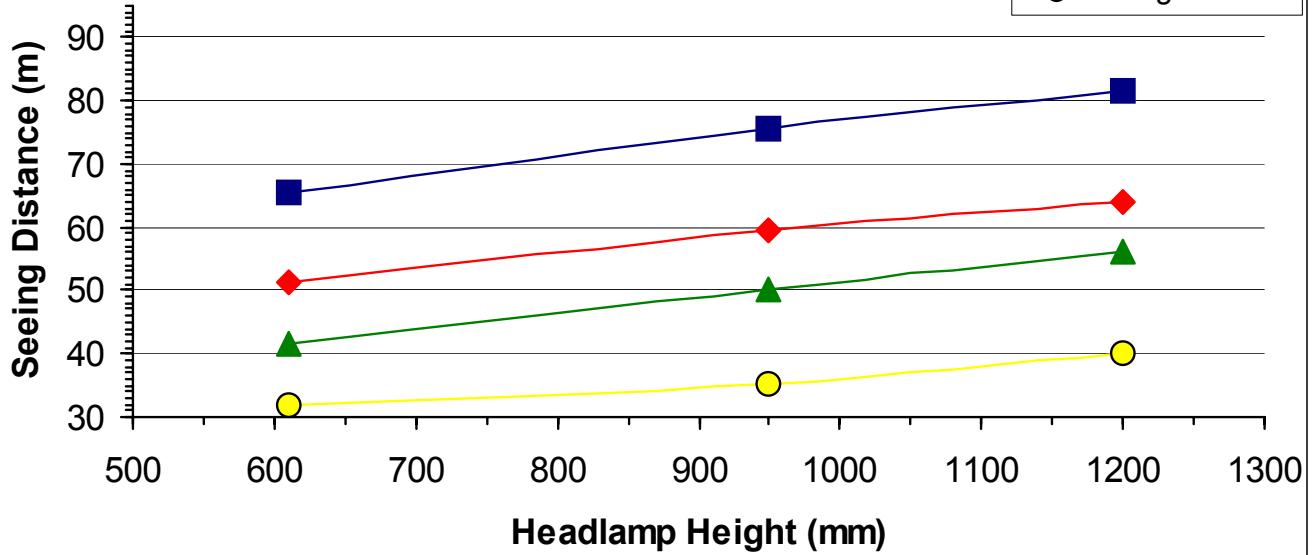
- 0 deg. Down
- .57 deg. Down
- 1 deg. Down
- 2 deg. Down



Pedestrian Seeing Distance

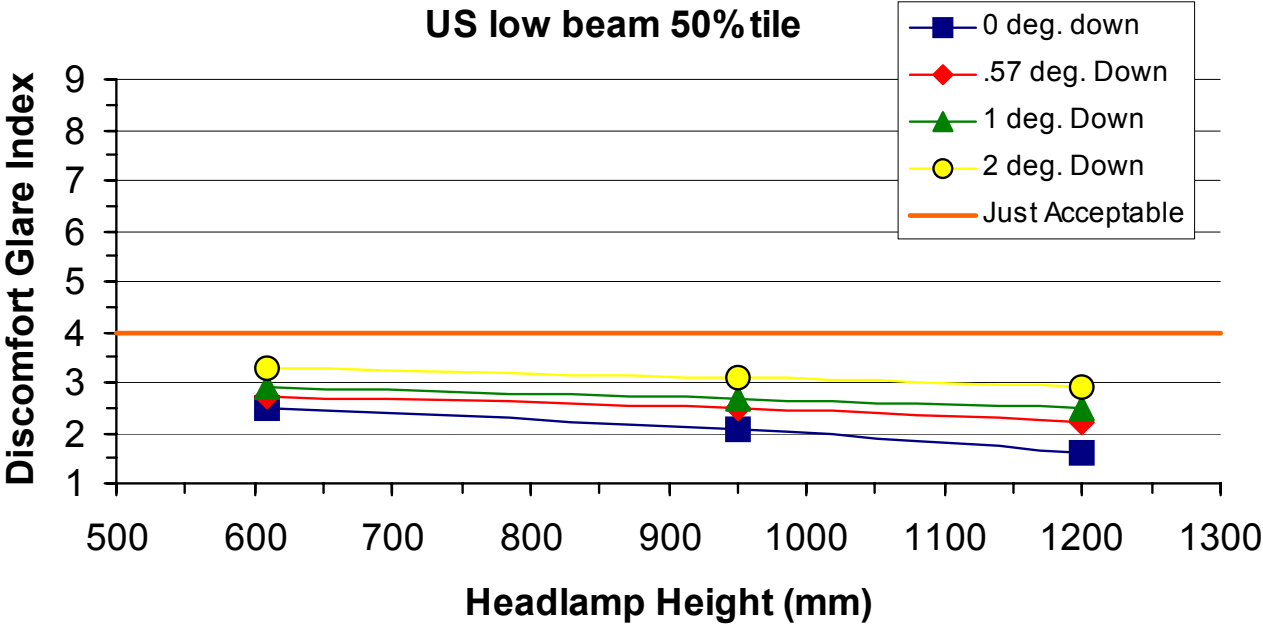
ECE low beam 50%tile

- 0 deg. down
- .57 deg. Down
- 1 deg. Down
- 2 deg. Down



Glare from Oncoming Vehicle at 100 ft.

US low beam 50% tile



Mirror Glare 'just acceptable' (De Boer rating of 4)

Detection loss trade-off

Inside - ~ 1050 mm
headlamp height

1200 to 1050 mm

1.5% for lane delineation

2.2% for pedestrian visibility

5% for overhead sign visibility

Outside - ~ 750 mm
headlamp height

1200 to 750 mm

3.7% for lane delineation

7.8% for pedestrian visibility

12.8% for overhead sign visibility

Based on PCDETECT computer simulation