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The Influence of Sun Loading on the Visibility of Clear-Lens Turn Signals

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16. Abstract  
There is some concern that turn signal lamps with clear outer lenses make it difficult in bright, sunny conditions to decide whether the signal is on or not. Two studies were performed. The first study was a survey of current practice in the U.S. with regard to the use of clear-lens turn signal lamps. The main results are that clear outer lenses on rear turn signal lamps are used in about 28% of all vehicle models, while the corresponding percentage for front turn signal lamps is about 70%.

The second study photometrically evaluated, under bright, sunny conditions, both luminance contrast and color contrast between the on and off states for turn signal lamps that use either an amber lens or a clear lens. The results indicate that luminance contrast between the on and off states is greater for lamps using an amber lens. On the other hand, the results indicate that color contrast between the on and off states is greater for lamps using a clear lens. Because luminance contrast is likely to be the primary variable influencing driver performance, these results suggest that using clear-lens turn signal lamps is likely to make it more difficult to determine, in bright, sunny conditions, whether the signal is on or not. However, the magnitude of the decrement in real-world performance with clear-lens signal lamps remains to be ascertained.

17. Key Words  
vehicle signaling, turn signals, lens, clear lens, sun, color, luminance, intensity, contrast, sun loading

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