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16. Abstract This study evaluated changes in the light output of rear signal lamps as a function of dirt accumulated during a 482-km drive, representing a 10-day amount of driving for a typical U.S. driver. The complete route was traversed on three separate occasions, under each of the following environmental conditions: dry, wet, and snowy/salty. Luminous intensity measurements were obtained for all U.S. and European test points. Photometry for each of two stop lamps was performed twice after the completion of each drive: first "as is" and then after cleaning. The results indicate that dirt deposits tended to cause the light output to decrease at the points tested. The reductions in the light output were greater for the driver-side than the passenger-side lamps under the wet and snowy/salty conditions, but smaller under the dry condition. The reductions after the dry drive were all less than 8%. However, after the wet and snowy/salty drives reductions of more than 25% occurred at several test points, with a maximum reduction of 37%. The greatest percentage reductions occurred for the points at and near the optical axes of the lamps, which had the highest original intensities, and at which maintaining adequate intensity is presumably most important. A theoretical analysis of the changes caused by dirt indicates that this is the pattern of results that will usually occur. A full evaluation of the significance of the effects of dirt that are quantified in this report should be done in the context of other factors that affect signal-lamp intensity, such as vehicle voltage control and lamp design. It may also be important to measure more fully the range and distributions of dirt conditions in the real world. However, the present results demonstrate that, within the range of common weather conditions, dirt can cause reductions of signal-lamp intensity that are large enough to be of concern, especially for the relatively important positions at and near the optical axes of signal lamps.					
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