

Retroreflectometer Guide – Iowa LTAP

A retroreflectometer works by placing the device against the sign face, with a light pulse emitted from a lens on the front of the unit when a trigger on the device is pulled. That light reflects off the sign face and returns to a light sensor in the unit that provides a measurement of the retroreflectivity level for the particular sign color. General retroreflectometer use involves a series of steps, beginning with calibration, conducting field measurements, and downloading or recording the data.

Prior to initial use, the retroreflectometer is calibrated to ensure it is making accurate measurements. Calibration is performed using a card comprised of a black surface and a white surface for which the retroreflectivity is known. The card is held to the lens of the retroreflectometer for the black surface first in order to calibrate the unit for a non-reflective surface. Then, the white surface is held to the lens. The values collected should be compared to those listed by the manufacturer in the instruction manual. Incorrect readings may be indicative of a problem with the unit or deterioration of the calibration card material, and the retroreflectometer should not be used for field retroreflectivity measurements unless the calibration measurements are accurate.

Following calibration, field data collection (or shop measurement of calibration/control signs) may occur. Field data collection can be difficult, as the height of some signs is such that it requires use of a ladder or an extender arm (specific for the retroreflectometer) to collect measurements. The inspector should park off the roadway and wear high visibility apparel when working in the field. If a particular location presents difficulties or a hazard for an individual collector, then a second person should be present to assist. Temporary traffic control may also be necessary during this process.

While manufacturers do not provide guidance on the number of readings of each sign color that should be made, ASTM International (2010) suggests a minimum of four readings. Most retroreflectometers can collect up to 20 readings for both the sign legend and background colors, so the user is not limited to collecting only four readings. In our experience, eight to 12 readings for both the legend and background taken at various locations across the sign have provided an accurate retroreflectivity measurement. No set measurement pattern is recommended, although working from the top of the sign downward is one approach that can be used. When reviewing the measurements collected by the retroreflectometer, **the user should focus on the 0.2 degree observation angle readings**, as these are the closest measurements that the reflectometer can make to the point of maximum brightness (which occurs at zero degrees).

Damage such as bullet holes, peeling or flaking sheeting and other areas that can lead to incorrect readings should be avoided. (Note that the presence of these other problems is also potentially indicative of other reasons a sign should be replaced.) Any site-specific information (sign location, inventory number, etc.) can also be entered into the retroreflectometer before or after readings are collected.

Once sign readings are completed, they will need to be recorded. If the measurements are being collected for calibration or control signs, the retroreflectivity reading for the legend and background of each sign can be read directly from the retroreflectometer and recorded with a marker on the back of the sign. If sign measurements are being collected in the field, those readings can be downloaded when the inspector returns to the office.