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# Maintaining Sign Retroreflectivity: Transparency Film Comparison Panels

Cornell Local Roads Program
New York LTAP Center

As part of the implementation of the 2009 Manual of Uniform Traffic Control Devices (MUTCD) Section 2A.08, *Maintaining Minimum Retroreflectivity*, requires that "*Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3*". The Cornell Local Roads has worked to develop a way to make inexpensive retroreflective comparison panels that can be used to confirm the level of retroreflectivity of signs in the field that have been identified as being questionable.

These panels are intended to supplement a visual nighttime inspection method that would be conducted to initially identify signs that would be identified as having questionable levels of retroreflectivity. Verification of the retroreflectivity levels should be done once per year to maintain that they are in compliance with the inspection requirements. This can be done by working with the county or contacting Cornell Local Roads Program. The retroreflectivity of the panels is should be higher than the minimum standards allowed by the MUTCD. Agencies using the panels as a primary tool may want to consider the purchase of more precise panels with RA values closer to the minimum allowed value from the MUTCD. These panels should only be used with post-mounted signs.

The concept is to use clear "overhead" sheets in layers on the sign panel to degrade the retroreflectivity of small comparison panel to a conservative level above the minimum retroreflective levels identified in Table 2A-3 of the MUTCD. The clear overhead sheets are the same ones used in the old days on overhead projectors and are readily available at a local office supply store.

Different sign colors will require a different number of layers of the clear sheets to reach the level of retroreflectivity desired due to the different initial level of retroreflectivity for each color panel and the different final levels of retroreflectivity required for each color.

**Possible colors needed as per Table 2A-3 Conservative RA value is shown.**

| | |
|---|---|
| Yellow | (RA = 75 cd/lx/m2) |
| Orange | (RA = 75) |
| Fluorescent yellow green | (RA = 75) |
| Green* | (RA = 15) |
| White* | (RA = 120) |
| Red | (RA = 7) |

* Post-mounted signs

**CORNELL LOCAL ROADS PROGRAM**
416 RILEY-ROBB HALL, ITHACA, NY 14853
PHONE: (607) 255-8033
FAX: (607) 255-4080
E-MAIL: *clrp@cornell.edu*
INTERNET: *www.clrp.cornell.edu*

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To simplify the need for multiple panels of the same color as per Table 2A-3, the Cornell Local Roads Program simplified the requirement for each color and utilized the most conservative retroreflectivity level. This approach minimizes the number of panels needed and provides an agency with “heads-up” on signs that are nearing the end of functionality.

For example, white is used with green on overhead and post-mounted signs, with red on stop signs and with black on regulatory signs. To avoid the need for four different white panels, we chose to use the minimum level for post-mounted green signs. This level, RA =120, is greater than both the white on stop signs (RA =35) and the white with black (RA =50) on regulatory signs.

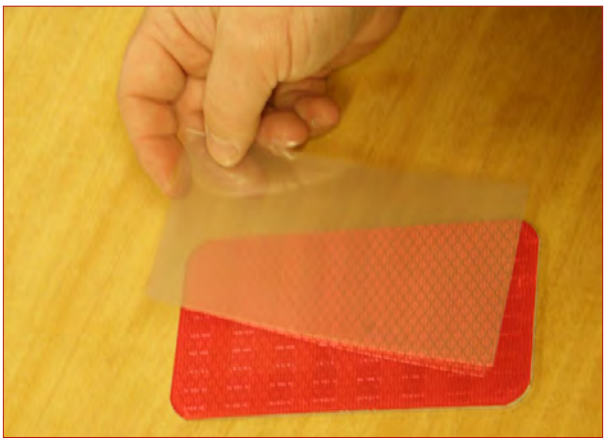
## SIGN PANEL ASSEMBLY


**Parts Needed:**

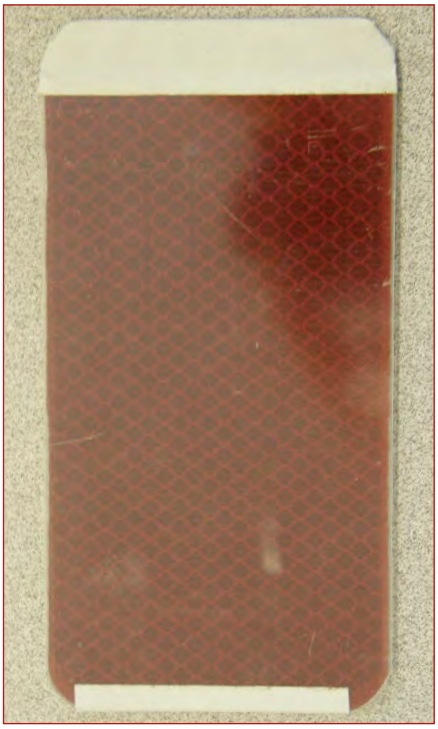
- Color panels of the common sign colors
- Clear overhead sheets
- Ruler
- Pencil
- Indelible Marker
- Scissors
- Laboratory or painters tape (not masking)
- Retroreflectometer

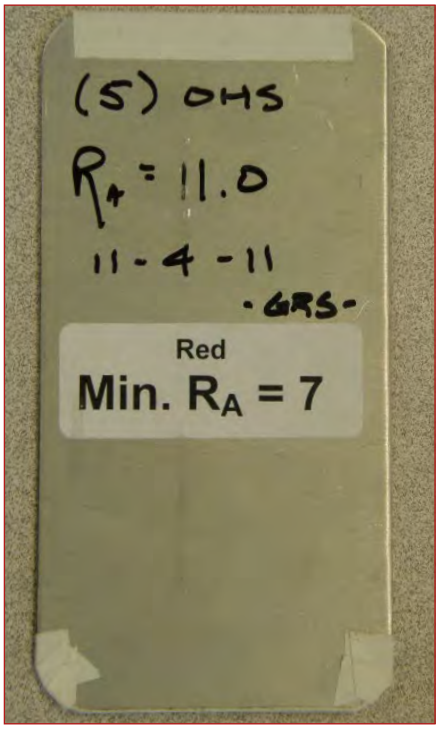
**Procedure:**

1. Obtain or make panels that are above the minimum level of retroreflectivity from Table 2A-3. These may be purchased from a local sign shop or cut from signs removed from service. A 3-inch by 6-inch panel is a good size for use during the nighttime inspection.
2. Measure and identify the existing level of retroreflectivity of the sign panels using a calibrated retroreflectometer.
3. Cut each of the overhead sheets into smaller sizes that match the panel sizes. The long length should be slightly shorter than the full panel length to allow a place for taping to the front of the panel. A 3 x 5 ½ inch size maximizes the number of panel sizes from a typical 8 ½ x 11 inch overhead sheet.
4. Once the clear panels sheets are cut, place them over the comparison panels one at a time, measuring the retroreflectivity level of the (panel + sheets) and comparing that value to the minimum acceptable retroreflective value for each specific color.



5. Continue adding additional clear sheets until the retroreflective level drops below the acceptable minimum level identified on Table 2A.3. At that point, remove the last clear sheet.
6. Tape the remaining clear sheets to the face of the panel. After taping, recheck the retroreflectivity of the completed panel.
7. Record this RA value along with the number of sheets, the date, and the initials of the person doing the work on the back of the panel in indelible pen. The RA value should be rechecked each year and the information on the back of the panel should be updated.






*Completed Panel - front and back*


*Completed Retroreflectivity Testing Kit*

## USE OF COMPARISON PANELS:

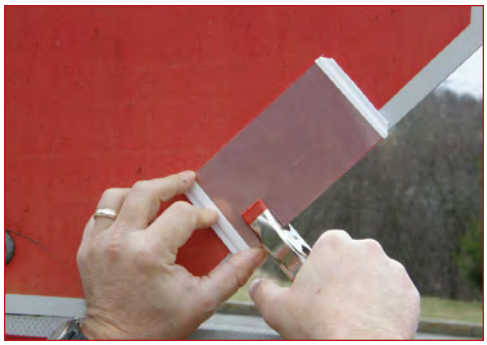
The use of Comparison Panels should be done as a supplement to a visual nighttime inspection. During the inspection, signs will be classified as good, poor or questionable with regards to their retroreflectivity. Those that are identified as poor should be taken out or service as soon as feasible. Once a sign is identified as questionable, the sign is inspected using the comparison panel. The description below assumes all proper work zone and other safety measures are taken as needed.

**Parts Needed:**

- Sign panels of appropriate colors
- Clamps to hold panels to sign (2)
- Flashlight (halogen recommended)
- Step ladder (if needed for taller signs)
- Small container to store and protect the panels, clamps, and flashlight

**Procedure:**

1. Identify the questionable sign.
2. Attach the appropriate colored comparison panel or panels to the sign using clamps.



3. Step back from the sign face approximately 15-25 feet, place the flashlight next to your ear, and shine the light toward the sign/comparison panel combination.



4. If the comparison panels are brighter than the sign, the sign should be replaced.
5. If the comparison panels are nearly the same brightness, the sign is near its functional life and should be identified as one to re-inspect in the future or to be replaced.
6. If the sign is brighter than the panels the sign is good until the next annual inspection.
7. Document the inspection of every sign including any conclusions found when using the comparison panels, and actions taken based on the conclusions of the inspection. Inspections are important, but are meaningless in court if they have not been documented.
8. When the inspections are complete, store the comparison panels in a safe, protected location away from the effects of UV light. This is important to extend the life of the panels and get the most use out of them.

> ***NOTE:*** *The photos showing panel use were taken during the day for clarity, but an actual inspection will need to be done at night!*