Background

Headlights are a vehicle’s most basic safety system. Yet, U.S. headlights, even when brand new, do not provide an adequate amount of light to illuminate a dark roadway. This deficiency is compounded when headlights become cloudy or yellowed, obscuring the bulb and resulting in a further reduction in light output. Headlights found on today’s vehicles are typically made of plastic with a protective coating to prevent scratching and sunlight damage. This coating, when exposed to prolonged periods of sunlight, begins to break down causing the yellowing or clouding commonly observed on degraded headlights. Headlights can sometimes begin showing signs of deterioration as early as three years of age but most commonly by five.

AAA conducted research to quantify the reduction in light output caused by deteriorated headlight lenses, the cost to replace and/or restore headlights and how much these methods improve visibility.

Key Findings

- Deteriorated headlight produce only 22 percent of the light output (low beam) than new, original headlights provide.
- Original equipment manufacturer headlight replacement parts restore headlights to like new condition.
- Professional and DIY restorations returned light output by up to 70 percent.

<table>
<thead>
<tr>
<th>Method</th>
<th>Percentage of Restored Light</th>
<th>Total Cost*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement – original equipment manufacturer headlamp assembly</td>
<td>100 percent</td>
<td>$331 - $427</td>
</tr>
<tr>
<td>Replacement – certified aftermarket headlamp assembly</td>
<td>90 percent</td>
<td>$131 - $259</td>
</tr>
<tr>
<td>Replacement – non-certified aftermarket headlamp assembly</td>
<td>83 percent</td>
<td>$104 - $190</td>
</tr>
<tr>
<td>Restoration - professional</td>
<td>70 percent</td>
<td>$77</td>
</tr>
<tr>
<td>Restoration - DIY</td>
<td>70 percent</td>
<td>$21</td>
</tr>
</tbody>
</table>

*Costs determined for the two test vehicles and is based on calculations for service, parts and tax. Methodology can be found in the full report.
Methodology

Headlight assemblies used in testing were for the left (driver’s) side of the vehicle. To quantify headlight performance, AAA contracted an accredited testing laboratory with expertise in automotive headlights and conducted testing according to industry standards. Headlights were tested according to FMVSS-108 standards with no modifications to the headlight assemblies under test or to the test procedures.

Professional headlight restoration systems used a power sanding technique to remove the original protective film from the headlight lens. The resulting scratched surface of the polycarbonate was than polished using increasingly finer grades of sanding discs and a protectant film was applied to the entire surface of the headlight lens.

The cost of replacement headlamp assemblies varies greatly based on the vehicle year, make and model. For this study, replacement costs were determined for the two test vehicles using online parts pricing, including tax and shipping, and labor for installation of the headlamp assembly. Professional restoration methods were calculated using national average labor rates plus materials. National average labor rates were calculated using AAA data. Do-it-yourself method was based on a standard kit purchased at an automotive supply store.

AAA Recommendations

• Routinely check headlights for signs of discoloration, such as a yellowed or cloudy appearance. If it’s difficult to see the bulb through the lens, have the headlights replaced or restored as soon as possible.

• Replacement and restoration services are available at most repair shops including AAA Approved Auto Repair facilities.

• Do-it-yourself restoration offers some savings for consumers, is relatively simple, and provides a sufficient improvement in light output.

• Make sure headlights are properly re-aimed to maximize forward lighting performance and minimize glare to oncoming and preceding motorists.