



# Color Contrast and Testing

When we talk about visual disabilities we usually concentrate on color blindness without realizing that there are other visual accessibility issues that we tend to ignore.

This came to bite me when I was testing a page using Chrome Dev Tools accessibility Test (process fully described in [Accessibility: Test your content](#)) where the color of my code blocks (using Prism and the Solarized light theme) were not providing enough contrast between text and background.

At an instinctual level I understand why this is important but how much contrast is too little and how do I measure it? What role does color play in contrast and accessibility?

Bright light from a screen or other sources prevents some people with low vision (including those with photophobia and with reading disabilities such as dyslexia) from reading and causes pain for some people. Some people turn down the brightness of their screen or use an overlay. For other people, it is easier to read with a bright screen, and they sometimes increase the brightness, especially on mobile devices.

Other people need high contrast between text and background, including many older people who lose contrast sensitivity from ageing. Some read better with dark text on light background.

For some people, common color combinations or colors from a limited color palette work fine, for example, black text on white background or the inverse with white text on black background. Other people need to select more specific background and text colors. For example, people who need low brightness overall, need to select the specific background and text colors that provide sufficient contrast for them yet not too high brightness. Readable and optimal color combinations differs vastly among individuals and can even vary for one individual depending on conditions such as fatigue and lighting.

Some modern designs, however, are so “subtle” that the contrast can actually be insufficient for some readers. Examples include contrasting light grey versus middle grey, middle pastels versus darks, or white versus light cyan (blue-green).

In the following sections we'll look at the following areas:

- What are we testing
- How to test contrast ratio manually
- How to test contrast ratio automatically
- Links and resources

# What Are We Testing?

In this particular case we are testing the **contrast ratio between foreground (text) and background colors**.

The values we seek are those from WCAG recommendations regarding contrast ratio and font sizes:

- Text that is considered small – approximately equivalent to 1.2em or **120% of the default body text size** – should have a contrast ratio of at least **4.5 : 1** to its background
- Text that is 1.2 ems or higher and bolded, or **normal text that is 1.5 em / 150% in size or greater**, should have a contrast ratio of at least **3 : 1**

How do we test these values? How do we know if they pass WCAG testing?

There are tools to test contrast between text and background colors but, until recently, they relied solely on [hexadecimal](#) colors. With designers increasingly using [rgb](#), and [hsl](#) CSS color systems combined with transparency make the testing harder.

Unfortunately this is an area where we can't really provide a one size fits all solutions because there are different types of visual disabilities that we have to account for.

So we need to work together with users when it comes to providing a good experience for people with visual disabilities. Some of the ideas below are things for the designers/developers to do and others are for users to implement and use.

We'll take a two-pronged approach: We'll test the colors of our design manually and then ensure that the resulting contrast ratios are still good using an automated testing tool.

# Manual Testing for Color Contrast

Testing contrast ratio is not an easy task; I've chosen to use Lea Verou's Easy color contrast ratios tool (explained [here](#) and live on [Github](#)) as my primary testing tool. It will give me both color contrast and the possibility of playing with other color combinations.

It also works with colors outside the 3 or 6-color hexadecimal values. It works with HSL, HSLA, and, RGBA. So the playground for experimentation grows even bigger.

Figure  
1: Lea  
Verou's  
Contrast  
Testing  
Tool

This is the first tool in our testing arsenal.

## Automatic Color Contrast Testing

The easiest way is to test your site for accessibility using automated tools. Tools like Lighthouse, aXe and aXe Coconut will get you started with accessibility testing.

I put it after manual testing rather than as the first idea about how to test contrast because I use manual testing to decide what colors to use (foreground versus background).

I use the accessibility testing integrated into Chrome Dev Tools Audits menu. Figure 2 (below) shows the result of running the accessibility audit.

Image of  
Lighthouse  
testing  
tool in  
Chrome  
showing  
results for  
a page in  
ESPN.com  
Figure 2:  
Lighthouse

Automated tools are awesome but they are far from complete. There are many accessibility checks that you must perform manually, either because it's hard to get the values programmatically or because it requires human judgement whether the rule passes or not.

It's also important to note that Lighthouse is a full accessibility tool. It goes beyond color contrast ratios and will give you more detailed information about your page's accessibility.

## Links and Resources

- About Colors on The Web
  - [Basic Color Theory For Web Designers](#)
  - [Introduction to Color in CSS](#)
  - [Which CSS Color System To Use Where](#)
  - [Understanding Gamma](#)
  - [Color for Web Designers: Understanding sRGB](#)
- Color Contrast and Accessibility
  - [Contrast Ratio Tool](#)
  - [A Study In Contrasts: Font Sizes, Contrast Ratio and Accessibility](#)
  - [Automatically Maximize Text Contrast On A Page](#)
- Color Formats in CSS
  - [Color Keywords](#)
  - [Using RGB Color in CSS](#)
  - [Using Hexadecimal Colors in CSS](#)
  - [An Easy Guide To HSL Color](#)
- Color Contrast Testing
  - [Lea Verou's Contrast Testing Tool](#)
  - [Snook's Testing Tool](#)
  - [Juicy Studio: CSS Colour Contrast Test](#)