## Colors as Hue, Saturation, and Lightness

Antenna House Formatter can use HSL colors by the hsl() and hsla() functions. Colors that are specified as hue, saturation, and lightness (HSL) values are more intuitive to use or to adjust than colors that are encoded by their red, green, and blue components. It is also easier to make sets of complementary or matching HSL colors by varying one of the hue, saturation, or lightness values to make the different colors. Use hsl(<H>, <S>, <L>) to specify a color, and use hsla(<H>, <S>, <L>, <A>) to specify a color with an additional alpha component representing its opacity. See also "hsl()" and "hsla()" in the Online Manual for details.

Hue is represented as the number of an angle of the color circle (i.e., the rainbow represented in a circle), where red is 0° (and 360°), green is 120°, and blue is 240°. Saturation, lightness, and opacity are represented either as 0% to 100% or 0.0 to 1.0. 100% saturation is full saturation, and 0% saturation is a shade of gray. 100% lightness is white, 50% lightness is "normal", and 0% lightness is black. 100% opacity is solid color, and 0% opacity is transparent.

The following example for the "cornflowerblue" named color (#6495ED, equivalent to hsl(219, 79%, 66%)) shows how colors can be adjusted by altering the hue, saturation and lightness values.

cornflowerblue (#6495ED)	20% more saturated	Saturation	20% less saturated			
20% lighter	hsl(219, 99%, 86%)	hsl(219, 79%, 86%)	hsl(219, 59%, 86%)			
Lightness	hsl(219, 99%, 66%)	hsl(219, 79%, 66%)	hsl(219, 59%, 66%)			
20% darker	hsl(219, 99%, 46%)	hsl(219, 79%, 46%)	hsl(219, 59%, 46%)			
219 249 279	309 339 9	39 69 99	129 159 189			

This example is for the "red" named color (#FF0000, equivalent to hsl(0, 100%, 50%)). Note that as "red" is 100% saturated, it cannot be made more saturated, so 120% saturation is clipped to 100%.

red (#FF0000)	20% more saturated	Saturation	20% less saturated			
20% lighter	hsl(0, 120%, 70%)	hsl(0, 100%, 70%)	hsl(0, 80%, 70%)			
Lightness	hsl(0, 120%, 50%) hsl(0, 100%, 50%) hsl(0, 80%, 50%)					
20% darker	hsl(0, 120%, 30%)	hsl(0, 100%, 30%)	hsl(0, 80%, 30%)			
0 30 60	90 120 150	180 210 240	270 300 330			

There are numerous "color picker" Internet sites that support picking a color or a range of related colors by HSL values. For example, <a href="http://www.workwithcolor.com/hsl-color-picker-01.htm">http://www.workwithcolor.com/hsl-color-picker-01.htm</a> and <a href="http://www.workwithcolor.com/mm-color-blender-01.htm">http://www.workwithcolor.com/mm-color-blender-01.htm</a>.

The following table<sup>(1)</sup> presents a range of saturation (S) and lightness (L) values for 12 hues (H). The hues are spaced at  $30^{\circ}$  intervals around the color circle, starting at  $0^{\circ}$ .

<sup>1.</sup> The table was made to fit on one page by specifying axf:overflow-condense="font-size" and Antenna House Formatter automatically adjusting the font size. See "axf:overflow-condense" in the Online Manual for details.

H: 0 (0° – Reds)					H: 30 (30° – Oranges)					H: 60 (60° – Yellows)							
		<b>← S</b> →						<b>←</b> S →						← S →			
100%	75%	50%	25%	0%	L↓	100%	75%	50%	25%	0%	L↓	100%	75%	50%	25%	0%	
					100%						100%						
					88%						88%						
					75%						75%						
					63%						63%						
					50%						50%						
					38%						38%						
					25%						25%						
					13%						13%						
					0%						0%						
H: 90 (90° – Yellow-Greens)						H: 120 (120° – Greens)						H: 150 (150° – Green-Cyans)					
← <b>S</b> →								<b>← S</b> →						← S →			
100%	75%	50%	25%	0%	$\mathbf{L}\downarrow$	100%	75%	50%	25%	0%	$\mathbf{L}\downarrow$	100%	75%	50%	25%	0%	
					100%						100%						
					88%						88%						
					75%						75%						
					63%						63%						
					50%						50%						
					38%						38%						
					25%						25%						
					13%						13%						
					0%						0%						
	H: 180	(180° –	Cyans)			H:	210 (21	.0° − Cy	an-Blu	es)			H: 240	(240° –	Blues)		
		← S →						← S →						<b>←</b> S →			
100%	75%	50%	25%	0%	L↓	100%	75%	50%	25%	0%	L↓	100%	75%	50%	25%	0%	
					100%						100%						
					0.007												
					88%						88%						
					75%						88% 75%						
					75%						75%						
					75% 63%						75% 63%						
					75% 63% 50% 38% 25%						75% 63% 50% 38% 25%						
					75% 63% 50% 38% 25% 13%						75% 63% 50% 38% 25% 13%						
					75% 63% 50% 38% 25%						75% 63% 50% 38% 25%						
H: 2	270 (270	° – Blue	-Magen	ntas)	75% 63% 50% 38% 25% 13%	H	: 300 (3	00° - M	lagenta	s)	75% 63% 50% 38% 25% 13%	H: 3	30 (330	° – Mag	genta-R	eds)	
		← S →			75% 63% 50% 38% 25% 13% 0%			← S →			75% 63% 50% 38% 25% 13% 0%		•	← S →			
H: 2	•		e-Magen	ntas)	75% 63% 50% 38% 25% 13% 0%	H			lagenta	s)	75% 63% 50% 38% 25% 13% 0%	H: 3			genta-R	eds)	
		← S →			75% 63% 50% 38% 25% 13% 0%			← S →			75% 63% 50% 38% 25% 13% 0%		•	← S →			
		← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88%			← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88%		•	← S →			
		← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75%			← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75%		•	← S →			
		← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63%			← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63%		•	← S →			
		← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63% 50%			← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63% 50%		•	← S →			
		← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63% 50% 38%			← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63% 50% 38%		•	← S →			
		← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63% 50% 38% 25%			← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63% 50% 38% 25%		•	← S →			
		← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63% 50% 38%			← S →			75% 63% 50% 38% 25% 13% 0%  L↓ 100% 88% 75% 63% 50% 38%		•	← S →			