

## Tips and Tricks Volume 1 Issue 1: AR Article

Have you ever purchased rings to make a certain weave only to find the rings you ordered were completely wrong? Do you want to deepen your understanding of chainmaille in general? If so, read on. This article is for you.

One of the most common and useful tools in constructing chainmaille jewelry or clothing is AR or Aspect Ratio. While it is a very necessary tool for figuring out what size rings will work with what weave, it is a misunderstood and underused number. After reading this article, AR should be better understood, and that understanding will open up various new possibilities in the exciting world of chainmaille.

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Let's define a few things that you may have heard of:

**Aspect Ratio, AR:** The relationship or ratio between the inner diameter of a ring and the diameter of the wire it is made out of.  $AR = \text{inner diameter} / \text{wire diameter}$ . AR is associated with **round wire** rings.

**AWG / SWG:** American Wire Gauge and Standard Wire Gauge. Two different wire gauge standards. Aluminumjumprings.com always lists the decimal size of the wire to eliminate confusion. As a general rule, precious metals are measured in AWG and all others measured in SWG. There are exceptions to this rule.

**Springback:** This is the percentage that the inner diameter of the coil, (ring) will expand after it is released from its corresponding mandrel. Final ring springback diameter is always larger than its corresponding mandrel. Springback changes for each material, wire size and inner diameter. **Springback always increases AR.**

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Now to the AR calculations, it's really easy, don't let the numbers fool you, there is only one simple division calculation to do.

First we will take a look at a 16g 1/4" bright aluminum ring.

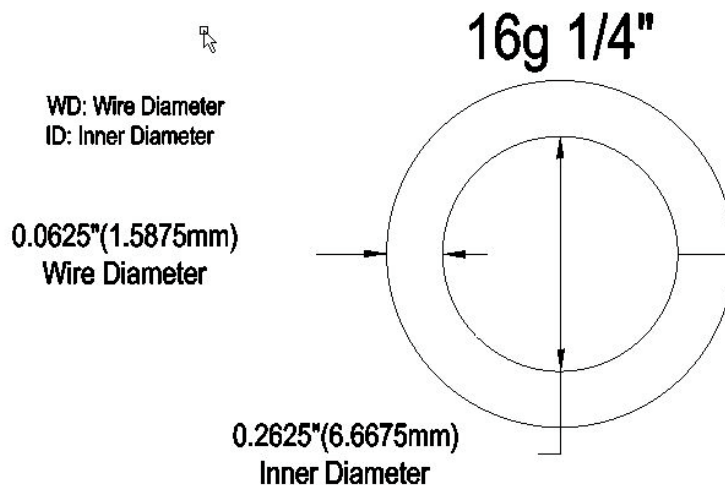


Figure 1

In figure 1, a 16g 1/4" BA ring is shown. The actual inner diameter due to springback is 0.2625" (6.6675mm) and 16g wire is 0.0625" (1.5875mm) in diameter.

$$\begin{aligned}AR &= ID/WD \\AR &= 0.2625"/0.0625" \\AR &= 4.2\end{aligned}$$

And it works out the same for the Metric measurements as well:

$$\begin{aligned}AR &= ID/WD \\AR &= 6.6675\text{mm}/1.5875\text{mm} \\AR &= 4.2\end{aligned}$$

See, AR is a number without units, a ratio. The units on top cancel out the units on the bottom and a unitless/dimensionless number is left.

Next, a 18g 5/32" bright aluminum ring.

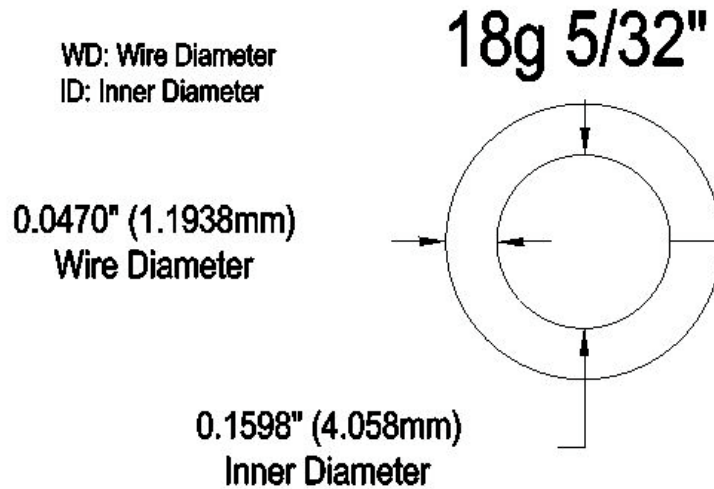


Figure 2

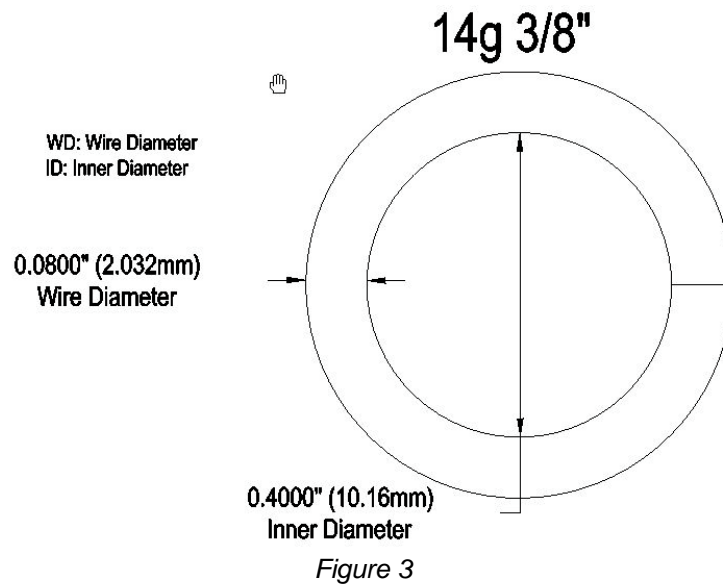
In figure 2; a 18g 5/32" ring is shown. Please refer to the figure for WD and ID measurements.

$$\begin{aligned}AR &= ID/WD \\AR &= 0.1598"/0.047" \\AR &= 3.4\end{aligned}$$

Once again, using this calculation the same AR is produced with metric measurements. We can also see that every time AR is calculated, the units, either inches or mm, cancel out and we are left with just a ratio.

$$\begin{aligned}AR &= ID/WD \\AR &= 4.058\text{mm}/1.1938\text{mm} \\AR &= 3.4\end{aligned}$$

Finally, a 14g 3/8" Bright Aluminum Ring.



In figure 3, a 14g 3/8" ring is shown. Please refer to the figure for WD and ID measurements.

$$\begin{aligned}AR &= ID/WD \\AR &= 0.400"/0.080" \\AR &= 5.0\end{aligned}$$

Every calculation is the same, just use the measurements you know to get AR. Try using the AR formula with metric measurements to convince yourself that the AR won't change from the inch measurement and that *it is really easy!*

The really nice part about AR is that you can use inner diameter and wire diameter to figure out AR for any material and size ring. ***It's really that easy.*** Inner diameter divided by wire diameter equals AR.

Aluminumjumprings.com publishes the AR for each ring along with its real inner diameter and wire diameter so you always have enough information to make informed purchases. As always, you can get a hold of us if you need any kind of assistance.

A few handy AR references for specific weaves have been included below (Our sweet spot AR's):

Byzantine:	3.4-3.6
E 4-1:	3.3-3.6
E 6-1:	4.8-6.0
Box chain:	4.8-5.3
Roundmaille:	3.3-3.6
FP 6-1:	5.1-5.7
HP 3-1:	3.9-4.5
HP 4-1:	4.7-5.3
Double Spiral:	4.6-4.9

We hope this article has been helpful, and look for more to come in the future!

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