

## Calculating the approximate diameter of a multi-strand cable:

The following formulae can be used to calculate the approximate diameter of a multi-strand cable where both the diameter of an individual strand and the strand-count are known:

$$s = (\pi d^2) / 4 \text{ (to get the area of a single strand)}$$

$$S = n.s \text{ (to get the approximate area of a defined number of strands)}$$

$$D = \sqrt{\frac{4S}{\pi}}$$

(To get the approximate diameter of a defined number of strands)

where  $s$  = area of a single strand

$d$  = diameter of a single strand

$D$  = diameter of a defined number of strands

$\pi$  = 3.14

$S$  = area of defined number of strands

$n$  = number of strands

As an example, let's assume we want to know the approximate diameter for a multi-strand cable having **86** strands of **0.20mm** wire (32 AWG).

First we need to calculate the area of a single strand: This is an accurate method to calculate the Diameter of Single Strand Wire.

$$0.20 \times 0.20 = 0.04$$

$$0.04 \times 3.14 = 0.1256$$

$$0.1256 \div 4 = 0.0314$$

The approximate area for 86 strands is then found:

$$86 \times 0.0314 = 2.7004$$

Now knowing the approximate area, we can get the approximate diameter by using the formula: This is an accurate method to calculate the Diameter of Multi Strand Cables.

$$D = \sqrt{\frac{4S}{\pi}}$$

$$(4 \times 2.7004) \div 3.14 = 3.4400$$

$$\sqrt{3.44}$$

$$= 1.8547 \text{ (1.85 mm Diameter)}$$

$$= 0.073 \text{ in Nominal Diameter}$$

**Another Example - 255 Strands of 0.050mm (44 AWG):**

$$0.050 \times 0.050 = 0.0025$$

$$0.0025 \times 3.14 = 0.00785$$

$$0.00785 \div 4 = 0.0019625$$

The approximate area for 255 strands is then found:

$$255 \times 0.0019625 = 0.500$$

Now knowing the approximate area, we can get the approximate diameter by using the formula: This is an accurate method to calculate the Diameter of Multi Strand Cables.

$$D = \sqrt{\frac{4S}{\pi}}$$

$$(4 \times 0.500) \div 3.14 = 0.637$$

$$\sqrt{0.637}$$

$$= 0.798 \text{ mm Diameter}$$

$$= 0.0314 \text{ in Nominal Diameter}$$