

Which Winch Is Right For You?

Typically, most winch manufacturers will suggest you should calculate the winch rating by taking the vehicle weight and multiplying it by 1.5 and that would be your minimum winch size. But this minimum rating is just that, a minimum. Certain factors can quickly cause your winch capacity to be exceeded so you need to think about your intended usage. Be aware that certain terrains and situations can put a much greater demand on a winch over the typical 1.5 multiplication rule of thumb. For instance a common cause for winching is mud. Mud has an incredible suction force on a stuck vehicle and in many cases the 1.5 rule of thumb is inadequate. Steep hills and frequent winching also put a greater than normal demand on an electric winch. Understanding the purpose of winch accessories, such as a snatch block, can offer great value when extra winch power is needed.

VEHICLE CURB WEIGHT

This is the manufacturer's published weight of a fueled automobile with standard equipment excluding cargo or passengers.

VEHICLE GROSS WEIGHT

Weight of a vehicle, fully equipped and serviced for operation, including the weight of the fuel, lubricants, coolant, vehicle tools and spares, crew, personal equipment, and load. Gross weight is often confused with curb weight, which represents the weight of the vehicle with no passengers or cargo. The difference between gross weight and curb weight is GVW represents the total passenger and cargo weight capacity of the vehicle. For example, a pickup truck with a curb weight of 3500 pounds might have a cargo capacity of 1500 pounds, resulting in a GVW 5000 pounds. (When fully loaded).

RECOMMENDED WINCH CAPACITY OVER VEHICLE WEIGHT

Many winch manufacturers recommend a winch capacity that is ONLY 1.5 times the amount of the vehicle's GVW. Greg Smith Equipment recommends that a potential winch customer calculate needed winch capacity be 2.0 times the vehicle's GVW. There are many extraneous factors contributing to the TRUE rolling GVW of any vehicle.

The serious off-roaders should use this easy formula:
Gross vehicle weight x 2.0 = minimum winch size.
5000 LB. truck x 2.0 = 10,000 LB. winch minimum.

**EXAMPLE: Weight Capacity Changes On Inclined
 Pulling Using A 10,000 LB. Winch To Pull
 A 5,000 LB. Vehicle**

<i>% Percent Incline</i>	<i>Pulling Capacity (10,000 LB. Winch)</i>
0% (Level Surface)	10,000 (100%)
5% (3 Degree)	6,670 (66.7%)
10% (6 Degree)	5,020 (50.2%)
20% (11 Degree)	3,400 (34%)
30% (17 Degree)	2,610 (26.1%)
50% (26 Degree)	1,860 (18.6%)
70% (35 Degree)	1,530 (15.3%)
100% (45 Degree)	1,290 (12.9%)

The red area shows that the 5,000 lb. vehicle is now too heavy for the 10,000 lb. winch to pull.

ATLAS WINCH PERFORMANCE

Winch Cable speed, weight capacity by cable layer and motor amperage for the Atlas 9500lbs, and 12000lbs winches.

9500 LBS LINE SPEED AND AMP DRAW (FIRST LAYER)

LINE PULL	Lbs	0	2000	4000	6000	8000	9500
	kgs	0	907	1814	2722	3629	4300
LINE SPEED	ft/min	27	15.8	11.7	9.36	7.7	7
	m/min	7.5	4.4	3.25	2.6	2.15	1.95
Motor Current	amps	70	145	210	280	350	415

9500 LBS LINE PULL AND CABLE CAPACITY

Layer of Cable		1	2	3	4
Rated Line	Lbs	9500	7700	6500	5700
Pull per layer	kgs	4300	3480	2940	2580
Cumulative	Lbs	16	42	72	94
Cable capacity	kgs	5	12	21	28

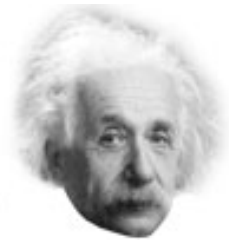
12000 LBS LINE SPEED AND AMP DRAW (FIRST LAYER)

LINE PULL	Lbs	0	2000	4000	6000	8000	10000	12000
	kgs	0	907	1814	2722	3629	4532	5440
LINE SPEED	ft/min	21.3	11.5	9.4	7.9	6.5	5.8	4.4
	m/min	6.5	3.5	2.85	2.4	2	1.75	1.35
Motor Current	amps	65	126	175	230	280	355	435

12000 LBS LINE PULL AND CABLE CAPACITY

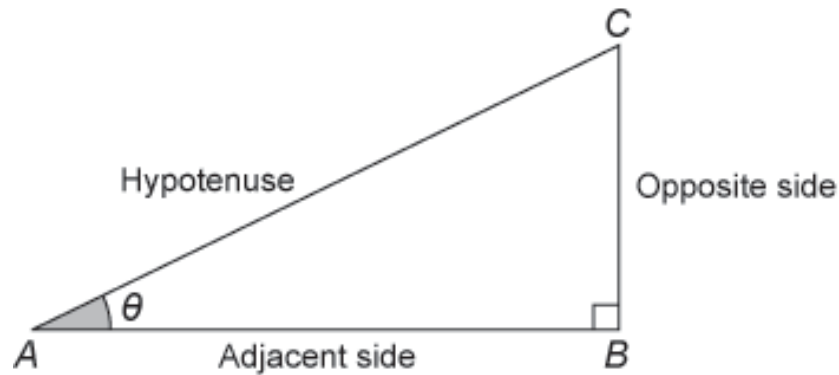
Layer of Cable		1	2	3	4
Rated Line	Lbs	12000	9210	8030	6894
Pull per layer	kgs	5440	4170	3640	3125
Cumulative	Lbs	17	41	71	82
Cable capacity	kgs	4.8	12	21	25

Make Yourself A Winch Genius! Learn How To Find The Angle Of An Incline Or Ramp.

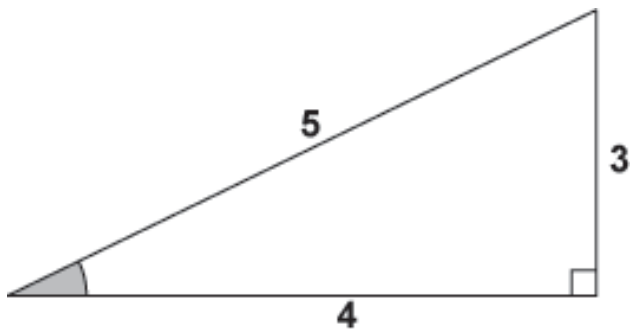


To find the angle of an incline or ramp with a right angle, 90°.
Using a scientific calculator find the lengths using the Pythagorean theorem:

$$a^2 + b^2 = c^2$$
$$c = \sqrt{a^2 + b^2}$$



Adjacent side = A
Opposite side = B
Hypotenuse = C
Θ = angle of incline or ramp



So if A= 4 units long and B = 3 units long then C would be 5 units long.
 Look at the trigonometry chart below and select the sine function.

$$\sin \theta = \frac{\text{Opposite side}}{\text{Hypotenuse}}$$

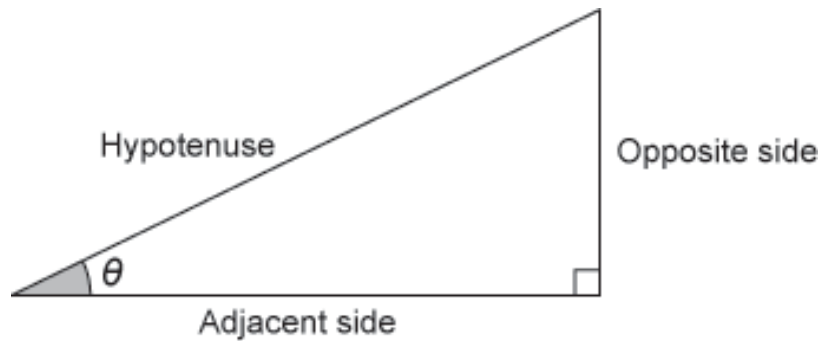
$$\cos \theta = \frac{\text{Adjacent side}}{\text{Hypotenuse}}$$

$$\tan \theta = \frac{\text{Opposite side}}{\text{Adjacent side}}$$

$$\sin \theta = \text{opposite} / \text{hypotenuse} \quad 3 / 5 = .6$$

To find the correct angle use the \sin^{-1} key on the scientific calculator.

$$.6 \sin^{-1} = 36.86^\circ \text{degrees of incline.}$$



Now add the drag coefficient for the rolling surface of your vehicle. Different surfaces provide different coefficient of friction. Use the chart below to calculate the average coefficient of friction of a vehicle on a zero incline (flat road surface).

Standard road surface (zero incline)	0.01 to .04
Grass (dry)	0.04 to 0.15
Hard packed Dirt or Gravel	0.15 to 0.30
Gravel or Dirt	0.20 to 0.50
Sand or Loose Gravel	0.35 to 0.85
Shallow Creeks, Mud, wet Clay, slick rocks, Swamps or Marshes, Snow, Ice	0.50 to 1.00

A standard flat road surface adds as much as 200 lbs. to a 5000 LB. vehicle.

Vehicle of 5000 LB. x .04 = 200 lbs.

Packed Gravel adds as much as 1500 lbs to a 5000 LB. vehicle.

Vehicle of 5000 LB. x .30 = 1500 lbs.

Our 5,000 LB. truck now has a REAL rolling GVW of up to 6,500 LB. on a hard packed gravel surface.