

GRADEABILITY – WHAT IS IT?

Gradeability is one of the most confusing elements of selecting access machinery, yet is it one of the most important to consider for your project to go smoothly. So, what is it?

What is Gradeability?

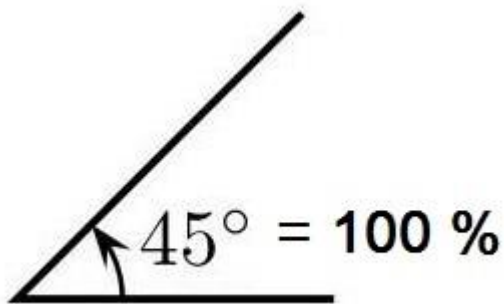
Gradeability is the steepest gradient a machine can climb, compared to the **Operating Angle** which is the steepest gradient a machine will operate on.

With Access equipment, gradeability specifically refers to **the size of the incline that a machine has the capacity to climb up or down**. This calculation is done with the machine in the stowed (lowered) position.

How to calculate gradeability?

Gradeability is widely calculated as a **percentage rather than degrees**. It can be confusing to convert between these two values and to visualise a percentage value in terms of an angle.

A 45° angle equates to 100% gradeability.



Formula to convert a percentage to degrees:

$$\text{Degrees} = \text{Tan}^{-1} (\text{Slope Percent}/100)$$

Occasionally access machinery specifications may show inclines expressed as degrees. This could be confusing if you are comparing between machines and both are expressed in different values.

Formula to convert degrees to a percentage:

$$\text{Percentage} = [\text{Tan} (\text{Degrees})] \times 100$$

How to choose a machine to move across an incline?

As a general rule Diesel machines (also known as rough terrain or all terrains) are equipped with rough terrain tyres and often with 4WD, giving the machine enough grunt to help propel it up a steeper gradient.

What is an Operating or Working Angle?

It is important to note that having a high gradeability does not mean the machine can operate on this same angle. The operating angle is the gradient at which the machine will elevate to full height. This is typically 5 degrees or less for most common machines. Or around 10 degrees for machines with outriggers or stabilisers.