Tech Notes

Understanding Liming Materials

1) Neutralising Value (NV)

Neutralising Value is a quality measure of how effective limestone can neutralise soil acids, compared to pure calcium carbonate. High quality limestone has a Neutralising Values greater than 95 %.

2) Particle Size

Particle size is also an indication of limestone effectiveness at neutralising soil acids. It is measured in several ways in Australia, most commonly in mm, mesh size, and micron. It is important to understand that the smaller the particles of the liming material, the more reactive it will be in the soil.

Lime particle sizing is reported as a percentage of particles below a set size.

Table 1: Particle size conversions

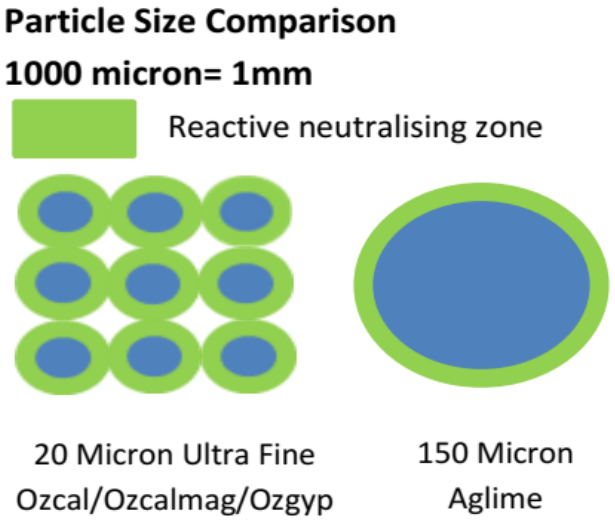
mm	mesh	micron
0.5	35	500
0.1	145	100
0.05	300	50

Table 2: Common Lime product sizing

Lime Material	Sizing
Agricultural Lime	Less than 500 microns
Super Fine Lime	Less than 100 microns
Ultra Fine Lime	Less than 50 microns

The average particle size of a liming material can be used to assess how quickly it will react in the soil. Larger particles have a lower surface area to volume ratio compared to smaller particles, meaning less surface is exposed to surrounding soil acids for reaction.

Lime is not water soluble hence a pH reaction can only occur when lime is in contact with soil acids. Once the surface of a large lime particle has neutralised the surrounding soil, there are no acids left to react with the rest of the internal lime material. The remnants of the large particles can remain unreacted in the soil for many years.



The relative lime application rate, according to particle size, can therefore be varied significantly while achieving similar results.

Ag Lime	Super Fine Lime	Ultra Fine Lime
100 % rate	30 % rate	15 % rate
1000 kgs / ha	300 kgs / ha	150 kgs / ha

3) Lime Delivery

Small particle lime offers the greatest reactivity, however there is a logistical issue with using this in terms of the ability to spread it evenly across the soil. For comparison, the width of a human hair is around 150 micron, while super-fine lime particles are 100 micron, and ultra-fine lime particles are less than 50 micron. Therefore, environmental conditions such as wind will greatly influence the accuracy of delivery. When you see traditional lime spreaders in a paddock, the dust rising up in the air is the wastage of highly effective ultra-fine and super-fine portion of lime.

Granulation of highly reactive super and ultra-fine lime particles, such as in Ozcal, allows even applications onto or into the soil using standard fertiliser application equipment. Once the granules encounter moisture, they rapidly break down and release ultra-fine particles into the soil.

The hardness and size of the lime granules is critical. Lime granules must be close to the hardness and size of common fertiliser granules to be effectively spread through grower's fertiliser equipment. If granules are soft they will crush during application, and therefore result in blockages and inconsistent rates of application. Over or undersize granules will not flow consistently and may separate in blends with fertilisers

Ozcal granules are hard with low dust, allowing application through specialist machinery such as air seeders, worm / paddle drives, oscillating tails and aerial equipment. The unique high quality of Ozcal also allows it to be blended with traditional fertilisers.