PRODUCT DATA SHEET

GRANUBOR®

15% B

$Na_2B_4O_7 \cdot 5H_2O$

Tetraborate pentahydrate

20 MULE TEAM BORAX™

RioTinto

Fully crop accessible boron

Granubor® is a white granular boron material produced solely from sodium tetraborate pentahydrate which is itself refined from tincal ore using only physical means: Crushing, steam, water, settling, and crystallization. *Granubor* contains no added ingredients, fillers, or coatings.

Granubor can be used in the following applications:

- Incorporate into blended fertilizers to provide an application ready mixture. *Granubor* is produced to meet the stringent requirements of the bulk blended fertilizer industry.
- Direct soil application where its physical form may present advantages in application, eg spreading under and around tree and plantation crops.
- Improve the soil boron status when it is low or borderline (ie less than 0.5ppm) level

Particle size distribution

Particle size distribution is also important in terms of compatibility. *Granubor* is screened between -4 and +14 mesh with very little outside these values. It has a uniform particle size distribution similar to commonly used prilled and granulated fertilizer blends.

Sieve specification	
U.S. Standard Sieve No.	% Retained Guarantee
-4 + 14	≥ 95.0

While mean particle size is important, so are the variation particle sizes within the product or the particle spread. *Granubor* closely approximates the particle size spread of two example blends. Other manufacturers do not.

Solubility

100% water-soluble, but with a gradual release rate of boron.

Compatible with a wide range of fertilizers

A number of factors affect quality when blending fertilizer ingredients. By far the most important one is the average size of the granules and how similar they are to the average granule size of the other ingredients in the blend. *Granubor* has an average particle size of around 2.8 mm, making it compatible with most fertilizers with a minimum of segregation in bagging, transport, and application.

Typical particle size*		
SGN	UI	Va
280	50	20

Bulk density		
kg/m³	lb/cu ft	Angle of repose
942.5	58.84 loose / 60 tight	30°

*SGN = d_{50} x 100 Materials having SGNs within 10% of other components' SGNs mix well

UI = d5 /d_{90} x 100 Measure of particle size spread: The higher the value, the tighter the distribution

Va = (d_{84}-d_{16}) 2 x d_{50} x 100 Variation index: The higher the value, the greater the deviation from the d_{50}

Transport and storage

Typical flow rate *Granubor* can be pneumatically transported, tipped and conveyed	
11 lbs/min	Measurement according to fertilizer industry standard EN 1235:1995

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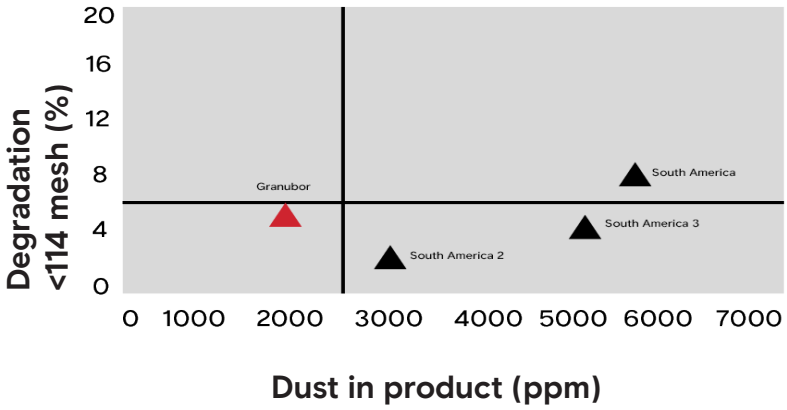
Crush resistance

Granubor will resist breakage in normal transport, handling, and during spreading.

Typical particle strength	
9 lbs/ granule	Forced required to crush particles with an average diameter of 2.4 mm

Granubor is specially surface treated with borate to reduce the possibility of degradation and dust content. *Granubor* and some competitors have been compared in terms these parameters. Results in the lower left quadrant are most acceptable.



OMRI Listed

Suitable for organic farming

OMRI LISTED
For Organic Use · OMRI.org

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Boron: An essential plant nutrient

Boron is one of eight micronutrients essential to all plant growth. Adequate boron is necessary for proper absorption of macronutrients and for maintaining the integrity of plant cell walls.

Detecting boron deficiency

Different crops show different signs of boron deficiency. Generally, but the time symptoms are seen, yields will already have been adversely affected. The best way to establish boron need is either through soil testing or tissue analysis. In this way, boron supplementation can form part of a regular crop fertilization program.

Predicting boron deficiency

Certain crops worldwide are known to be more susceptible to boron deficiency than others. Specific crop information can be found at www.borax.com/ag.

There are several factors which need to be taken into account when boron deficiency may be suspected:

- High rainfall
- Recent liming (pH over 6.6)
- Previous cropping
- Boron removal by previous crops
- No boron nutrition
- Sandy soils
- High organic matter

Correcting boron deficiency

Boron deficiency can be remedied by the correct application of a borate containing material in solid or liquid fertilizers, to the seedbed in annual crops or under the foliar canopy of perennial crops. Crops can also be sprayed with boron containing solutions. These are normally tank mixed with other micronutrients or agrochemical products. Mixing with other sprays as part of a program not only saves on application cost, but allows for precise timing.

About U.S. Borax

U.S. Borax, part of Rio Tinto, is a global leader in the supply and science of borates—naturally-occurring minerals containing boron and other elements. We are 1,000 people serving 650 customers with more than 1,800 delivery locations globally. We supply around 30% of the world's need for refined borates from our world-class mine in Boron, California, about 100 miles northeast of Los Angeles.

Our local agriculture experts understand the uses and benefits of boron on crops. In addition to a global sales team, we have a number of agronomists on staff to help fertilizer distributors maximize the benefits of borates in agriculture applications. Our ag team can answer individual growers' questions and concerns about their particular crop.

High quality, high reliability, high performance borate products. It's what we're known for.