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# Datasheet CH 197

Gillespie Borate™ is a blended borate mineral for use in glaze formulas replacing Gerstley Borate on a pound for pound basis.

## Chemical Analysis [Typical]

Oxide	Weight Percent	Oxide	Weight Percent
SiO <sub>2</sub>	11.8%	SrO	0.45%
Al <sub>2</sub> O <sub>3</sub>	1.7%	K <sub>2</sub> O	0.01%
B <sub>2</sub> O <sub>3</sub>	24.5%	Na <sub>2</sub> O	3.77%
CaO	23.0%	LOI	30.9%
MgO	3.9%	Total	

## Features

- Consistency -- Manufactured from high purity refined raw materials, Gillespie Borate™ is highly consistent from batch to batch.
- Oxide Match -- Virtually identical to Gerstley Borate, this product requires no adjustment to formula and no extra additives are needed.
- Mineral Match -- Gillespie Borate™ provides the same minerals to the glaze as Gerstley Borate, thus imparting the same glaze activity, texture and effects.
- Particle Size Match -- As a -200 mesh material, Gillespie Borate™ combines well with other glaze raw materials. Plasticity Match -- A high colloid and clay content gives the plasticity necessary for many applications.
- Reduced Glaze Defects -- Our laboratory studies indicate that Gillespie Borate™ gives increased glaze surface smoothness and a reduction in crawling and pinhole defects.
- Lower In Off-Color Impurities -- As a refined blended material, Gillespie Borate™ contains few impurities and produces brighter glazes and colors.

## Applications

- Raku, Earthenware, Stoneware and Porcelain -- Excellent over a wide temperature range from below cone 06 to cone 10
- Special Effects -- Excellent glaze texture and activity for specialty glazes.
- Coloured Glazes -- GB works well with most pigments and has an exceptionally wide colour palette.

### **Finding a replacement for Gerstley Borate**

Gerstley borate is a complex ore but a major benefit of the unrefined naturally formed combination of minerals is its ability to produce variegated surfaces in glazes. Potter's firing electric kilns which have oxidation atmospheres often produce flat static glaze effects much like bathroom tile colours. Carbon based fuelled kilns, such as natural gas, propane or wood have the capacity to fire in oxidation, neutral, and reduction atmospheres which can introduce varied glaze colours and surfaces. If it wasn't for this unique characteristic of Gerstley borate it would have been abandoned when the first series of its faults appeared.

Gerstley borate's wide swings in chemical composition are a factor in finding a direct substitute. It's like trying to hit a moving target when deciding on what chemical formula to use when developing a substitute.

However, Gillespie borate, a product produced by Hammill & Gillespie of New Jersey, has proven to be a reliable one-for-one substitute. In many instances it is difficult to arrive at such a close match as many raw materials are not mineralogically pure when removed from the earth. Any potential substitute has to match on many points and produce the same results in fired glazes.

Two popular cone 6 glazes were chosen for comparative testing. Both formulas contain relatively high levels of Gerstley borate which have been replaced by Gillespie borate. A stoneware clay body was formed into vertical test tiles, bisque fired to cone 06 (1828 0 F.) and then placed throughout a 7 cu/ft. electric kiln reaching cone 6 (2232 0 F.) in 14 hours.

### **Recommendations for using Gillespie borate** □

Do not use excess water in mixing the glaze.

- Store the wet glaze in an airtight container.
- When using any substitute material always test it in a small batch of glaze.
- Test the glaze on the same clay body you will use in production.
- After applying the glaze to several vertical test tiles place them throughout the kiln.