



BEST USE PRACTICES FOR BLENDING DISPERSIBLE GRANULE HUMIC PRODUCTS

Humic DG™

Black Gypsum DG™

Most common types of fertilizer blenders (tower, volumetric, batch blender) can be used to blend Humic DG and Black Gypsum DG with fertilizers. In order to ensure the successful blending of dispersible granular humic products from The Andersons, we have included below a collection of blending guidelines and answers to frequently asked questions.

BLENDING INSTRUCTIONS

1. Determine the following:
 - a. Amount of Humic DG or Black Gypsum DG needed per acre
 - b. The spread rate of the fertilizer per acre
 - c. Total number of acres covered per ton
2. Refer to page 3 for Humic DG and Black Gypsum rate tables and correlate to the batch size. Fill blender with NPK and filler, then add Humic DG or Black Gypsum with micronutrients.
3. Blend adequately for 3-5 minutes (or as your equipment dictates) to insure complete mixing.

BEST USE PRACTICES

- Blending equipment should be in good repair and properly adjusted
- Belt conveyers are the preferred conveyance system
- Use of screw augers is acceptable; a larger diameter is preferred
- Screw augers and drag chains should be run as full as possible
- Avoid excessive blending time. Blending times should be limited to the minimum necessary for uniform mixing.

Humic DG and Black Gypsum DG have been specifically engineered to provide the most available humate content with the convenience of blendability and spreadability. While these products are the most stable humic source to blend with granular fertilizers, they are still subject to conventional blending guidelines. The chart on page 4 lists blends using raw materials with limited compatibility and some of their most common positive and negative interactions. In addition, it is suggested that raw materials of poor quality or those that contain high levels of moisture also be avoided.

BLENDING FAQS

DO HUMIC DG AND BLACK GYPSUM DG CONTAIN CONVENTIONAL NUTRIENTS?

Humic DG and Black Gypsum DG contain no NPK nutrients. They do contain very minor amounts of secondary and minor nutrients. Humic substances contained in Humic DG and Black Gypsum DG can activate and chelate both major and minor elements in the soil.

HOW DOES HUMIC DG WORK?

Humic DG is a unique combination of two sources of Humic substances that provide fulvic acid, humic acid, humin and humic acid precursor. The Dispersible Granule (DG) Technology delivers the humic substance to the soil, where each granule disperses into thousands of sub-particles that self incorporate into your soil. The humic substances will provide a food source (C) to the soil microbes causing them to flourish. Essential macro and micro nutrients held in the soil will become more available and additional fertility will be utilized more efficiently.

HOW DOES BLACK GYPSUM DG WORK?

Black Gypsum DG granules are a homogenous mixture of natural gypsum and humic substances that are prilled into a dispersible granule form, creating a unique bio-amendment. These homogenous granules deliver available calcium, sulfur, carbon and humic acid to the plant and soil.

HOW ARE HUMIC DG AND BLACK GYPSUM DG BEST APPLIED?

These products can be applied through all types of commercial spreading equipment including; airflow (pneumatic), rotary/spinner and fertilizer/insecticide metering boxes. For best results all application equipment should be properly maintained and calibrated.



FOR MORE INFORMATION
www.AndersonsHumates.com
800-253-5296

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CAN HUMIC DG AND BLACK GYPSUM DG BE BLENDED WITH CONVENTIONAL FERTILIZER RAW MATERIALS AND ORGANIC PRODUCTS?

Yes. A good quality blend is achieved by using the following practices:

- Use in blends with a similar and consistent particle range (200-280 SGN).
- Use caution using humic products in blends where compatibility concerns are present with conventional raw materials alone (ex. urea and muriate of potash). See the chart on the next page for the most common interactions.
- Avoid using with raw materials that contain a high level of moisture.

Humic DG and Black Gypsum DG's unique manufacturing process creates granules with less than 8% moisture, which is far less than the amount found in raw humates. This increases the ability to generate stable blends with fertilizer materials. These products have been found to be compatible with most traditional granular fertilizer materials, including materials with hygroscopic tendencies such as urea. Blending Humic DG or Black Gypsum DG with fertilizer raw materials of limited compatibility may reduce the potential for success in blending a high quality granular blend.

If your intention is to store Humic DG or Black Gypsum DG blends for a period to exceed five days, best practice dictates the use of SOP vs. KCL/MOP.

DOES HUMIC DG OR BLACK GYPSUM DG INCREASE THE HYGROSCOPIC NATURE OF UREA OR OTHER MOISTURE SENSITIVE NITROGEN SOURCES WHEN USED IN A PHYSICAL BLEND?

While most commercially available humates have more than 20% moisture and often contain free water, Humic DG and Black Gypsum DG are "engineered granules" with low latent moisture (less than 8%). This means they are less likely to cause a hygroscopic attraction in a blend with sensitive materials such as urea compared to competitive humic products.

If you wish to test the compatibility of Humic DG or Black Gypsum DG with a particular material or blend, place a small amount of the product in a quart jar and leave undisturbed for 3 days. If the material is flowable and clump free after the third day, the blend should be acceptable. The Andersons can provide samples of Humic DG and Black Gypsum DG to assist with this evaluation. When properly packaged and stored, Humic DG and Black Gypsum DG have a stable shelf life.

ARE THERE ANY STORAGE CONSIDERATIONS FOR HUMIC DG OR BLACK GYPSUM DG?

These products are shipped in 40 pound bags and 2,000 pound bulk bags. They are storage stable in a broad range of environmental conditions. After one year of storage, Humic DG and Black Gypsum DG maintained a resistance to attrition (prill breakdown in blending or spreading process) and moisture absorption.

Under compression, palletized poly pillow bags of Humic DG and Black Gypsum DG blended with fertilizer had moderate "bag setup". When these bags were handled, as would be expected in use, the product passed the acceptability test for fitness of use. Dry warehouse space is the only consideration for storage of Humic DG and Black Gypsum DG.

CAN HUMIC DG AND BLACK GYPSUM DG BE BLENDED WITH COMMONLY USED PRE-EMERGENT HERBICIDES IN FERTILIZERS?

These products contain highly oxidized carbon and organic acids that, in close association with certain classes of pre-emergent herbicides, may interfere with their efficacy. These same compounds, when applied to foliage in form of liquid fulvic and humic acid, have been shown to exhibit a beneficial effect towards the post emergent control of broadleaf weeds. However, no testing has been performed to determine the stability of herbicides on Humic DG and Black Gypsum DG.

WILL HUMIC DG OR BLACK GYPSUM DG WASH AWAY FROM APPLICATION SITE IN HEAVY RAINS?

Humic DG and Black Gypsum DG are dispersible granule products. Within a few minutes of application in a light rain or irrigation cycle, they will disperse into thousands of sub particles and begin self incorporation, allowing each sub particle to stay put as moisture increases. The only time this is not the case is when the surface water flow is strong enough to erode soil in a conventional or low residue cover field.

BLEND RATES

The following tables are a guide for calculating blend rates of Humic DG and Black Gypsum DG with fertilizer blends based on finished goods applied per acre. Determine Humic DG or Black Gypsum DG app rate (Step 1), then determine finished good (FG) application rate (Step 2) to determine how much Humic DG to use in 1 ton BOM (Step 3). The application and blending rates below are applicable only to Humic DG - 240 SGN, Black Gypsum DG - 240 SGN (21% humic acid) and Black Gypsum DG - 240 SGN (10% humic acid).

Humic DG™

Black Gypsum DG™

Step 1	Step 2	Step 3 (use to build FG formula)	
Desired Humic DG Rate (lbs/acre)	Finished Good application rate/acre	Weight % Humic DG in blend	lbs/ton of Humic DG
10.0	100	0.100	200
	150	0.067	133
	200	0.050	100
	250	0.040	80
	300	0.033	67
	350	0.029	57
	400	0.025	50

Step 1	Step 2	Step 3 (use to build FG formula)	
Desired Black Gypsum DG Rate (lbs/acre)	Finished Good application rate/acre	Weight % Black Gypsum DG in blend	lbs/ton of Black Gypsum DG
10.0	150	0.067	134
	175	0.0575	115
	200	0.05	100
	300	0.033	77
	400	0.025	50
	600	0.017	34

Step 1	Step 2	Step 3 (use to build FG formula)	
Desired Humic DG Rate (lbs/acre)	Finished Good application rate/acre	Weight % Humic DG in blend	lbs/ton of Humic DG
20.0	100	0.200	400
	150	0.133	267
	200	0.100	200
	250	0.080	160
	300	0.067	133
	350	0.057	114
	400	0.050	100

Step 1	Step 2	Step 3 (use to build FG formula)	
Desired Black Gypsum DG Rate (lbs/acre)	Finished Good application rate/acre	Weight % Black Gypsum DG in blend	lbs/ton of Black Gypsum DG
20.0	150	0.134	268
	175	0.115	230
	200	0.100	200
	300	0.072	145
	400	0.050	100
	600	0.034	67

Step 1	Step 2	Step 3 (use to build FG formula)	
Desired Humic DG Rate (lbs/acre)	Finished Good application rate/acre	Weight % Humic DG in blend	lbs/ton of Humic DG
30.0	100	0.300	600
	150	0.200	400
	200	0.150	300
	250	0.120	240
	300	0.100	200
	350	0.086	171
	400	0.075	150

Step 1	Step 2	Step 3 (use to build FG formula)	
Desired Black Gypsum DG Rate (lbs/acre)	Finished Good application rate/acre	Weight % Black Gypsum DG in blend	lbs/ton of Black Gypsum DG
30.0	150	0.200	400
	175	0.172	343
	200	0.150	300
	300	0.100	200
	400	0.075	150
	600	0.050	100

Step 1	Step 2	Step 3 (use to build FG formula)	
Desired Humic DG Rate (lbs/acre)	Finished Good application rate/acre	Weight % Humic DG in blend	lbs/ton of Humic DG
40.0	100	0.400	800
	150	0.267	533
	200	0.200	400
	250	0.160	320
	300	0.133	267
	350	0.114	229
	400	0.100	200

Step 1	Step 2	Step 3 (use to build FG formula)	
Desired Black Gypsum DG Rate (lbs/acre)	Finished Good application rate/acre	Weight % Black Gypsum DG in blend	lbs/ton of Black Gypsum DG
40.0	150	0.266	533.2
	175	0.229	457.2
	200	0.199	399.9
	300	0.133	266.4
	400	0.100	200
	600	0.066	133.2



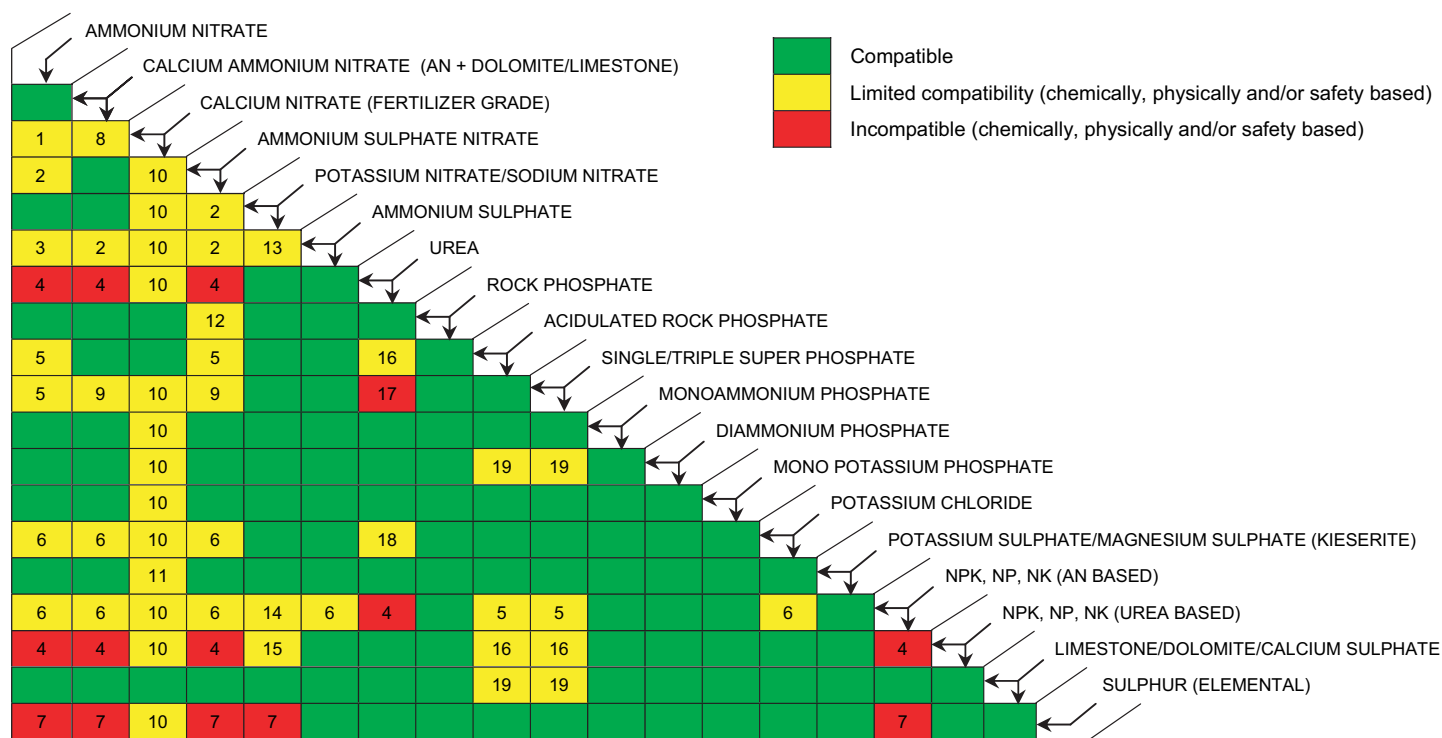
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COMPATIBILITY OF VARIOUS FERTILIZER MATERIALS

This chart lists some of the most common interactions. Carefully note that common raw materials currently deemed “easy to blend” can have negative interactions under the right conditions in the blending operation.



1. Due to the hygroscopic behaviour of both products, the type of stabilisation of the ammonium nitrate grade could influence the storage properties.
2. Consider the safety implications regarding the detonability of the blend (AN/AS mixtures) and legislative implications.
3. Consider the safety implications regarding the detonability of the blend (AN/AS mixtures), the impact of free acid and organic impurities, if present, and legislative implications.
4. Mixture will quickly become wet and absorb moisture resulting in the formation of liquid or slurry. There could also be safety implications.
5. If free acid is present it could cause a very slow decomposition of AN, affecting, for example, the packaging.
6. Consider the possibility of self-sustaining decomposition and the overall level of oil coating.
7. Sulphur is combustible and can react with nitrates e.g. AN, KNO₃ and NaNO₃.
8. Due to the hygroscopic behaviour of both products the type of stabilisation of the ammonium nitrate based fertiliser could influence the storage properties.
9. Consider the moisture content of the SSP/TSP.
10. Consider the relative humidity during blending.
11. Risk of formation of gypsum.
12. No experience but this can be expected to be compatible. Confirm by test and/or analysis.
13. Consider impurities in AS and the drop in the critical relative humidity of the blend.
14. Consider the likely impact of additional nitrate.
15. Consider the possibility of ammonium phosphate/potassium nitrate reaction with urea and the relative humidity during blending, to avoid caking.
16. If free acid is present, there is a possibility of hydrolysis of urea giving ammonia and carbon dioxide.
17. Formation of very sticky urea phosphate.
18. Potential caking problem due to moisture.
19. If free acid is present, consider the risk of a reaction e.g. neutralisation with ammonia and acid attack with carbonates.

Guidance for the Compatibility of Fertilizer Blending Materials, EFMA, June 2006