10 good reasons to use Honeywell Sulf-N® ammonium sulfate.

1. Contains 21% nitrogen and 24% sulfur.
2. Nitrogen in the ammonium form, means minimum susceptibility to losses from leaching, denitrification and volatilization.
3. Sulfur in the sulfate form means immediate availability to plant roots.
4. Can increase quality, yields and profitability.
5. High-analysis product: 900 pounds of plant food per ton.
6. Easy to store because of its anti-caking agent and compatibility with other dry fertilizers.
7. Granular grade is screen-sized for uniform blending with all other granular fertilizer products.
8. Can be dissolved to make a solution (38% by weight) or suspended in concentrations up to 70%.
9. Can increase phosphate efficiency.
10. University proven across a broad geography of field and crop conditions. Honeywell is the world's largest single site producer of ammonium sulfate and the global leader in agronomic research and promotion of this product.

January 2008

Honeywell Resins & Chemicals
P.O. Box 1559
Hopewell, VA 23860
Phone: 804-541-9411
Fax: 804-541-9418
www.honeywell.com/sulfn

Honeywell

Honeywell Sulf-N® Ammonium Sulfate

product guide

Honeywell

Honeywell Sulf-N® Ammonium Sulfate
21-0-0-24S

Chemical Content	%
Nitrogen (N)	21 min.
Sulfur (S)	24 min.
Free Acidity (H_2SO_4)	0.1 max
Moisture	1.0 max
Chemical Formula	**$(NH_4)_2SO_4$**
Molecular Weight	**132.14**
Angle of Repose	**35°**

Typical screen analysis:
cumulative % retained on Tyler screen

Tyler Screen	Granular Avg.	Granular Range*	Mid Avg.	Mid Range*	Soluble Avg.	Soluble Range*
6	11	0-25	0	0-1	0	0-0
8	47	15-75	1	0-3	—	—
9	74	50-95	5	0-12	—	—
10	90	75-100	28	10-50	—	—
12	97	90-100	71	60-90	1	0-5
14	99	95-100	94	85-100	14	5-25
16	—	—	98	95-100	40	20-60
24	—	—	—	—	73	50-90
35	—	—	—	—	92	85-100
-35	—	—	—	—	8	0-15
SGN	235	200-280	156	140-165	91	70-110
UI	48	35-55	60	50-65	27	23-31
Bulk Den. lb/ft³	65	63-67	65	63-67	64	62-66

*+/-2 Standard Deviation

Available Sizes

Granular: with improved size and uniformity, meets higher quality standards to give you the ideal specifications for bulk blending. Coated with an anti-caking agent to maintain ease of handling.


Granular

Mid: highly uniform and coated with an anti-caking agent to maintain ease of handling. It is ideal for direct application, offering spread patterns comparable to granular grade products.


Mid

Soluble: for use in true liquid applications, manufactured fertilizers, industrial applications and herbicide adjuvants. Treated with water soluble dedusting agent that suppresses fugitive dust and promotes clean and efficient handling. Rapidly dissolves in water to make base grade ammonium sulfate solutions (8-0-0-9S).

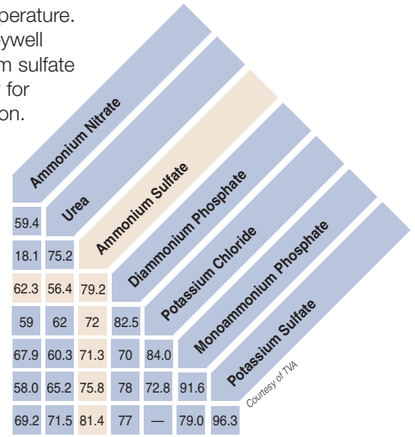

Soluble

Solubility

Honeywell Sulf-N® ammonium sulfate is soluble in water. A 38% solution of ammonium sulfate by weight (8-0-0-9S) can be made by mixing soluble grade with water. No added heat is required for dissolving 762 pounds of Sulf-N ammonium sulfate into 1,238 pounds of water. This product is stable down to 14°F. Higher concentrations, up to 70% by weight, can be produced when suspended with 2% attapulgite clay.

Critical Humidities

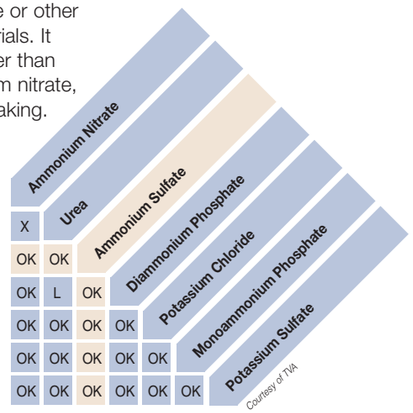
Fertilizer materials tend to absorb moisture at different rates depending on relative humidity and temperature. Blends with Honeywell Sulf-N® ammonium sulfate have a low affinity for moisture absorption.



Critical Humidities of Fertilizer Salts and Mixtures at 86°F (% Relative Humidity)

Compatibility

Honeywell Sulf-N ammonium sulfate can be stored next to or blended with urea, ammonium nitrate or other dry fertilizer materials. It absorbs less water than urea or ammonium nitrate, resulting in less caking.

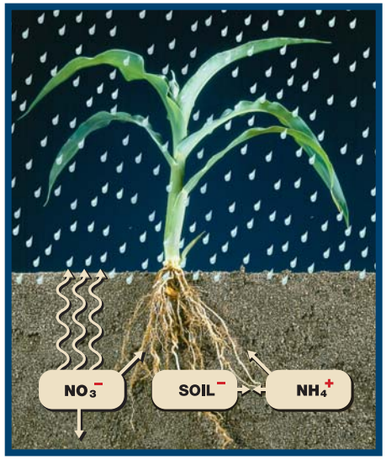


Chemical Compatibility of Blend Materials
X = Incompatible L = Limited Compatibility
OK = Compatible

Agronomic Advantages

Honeywell Sulf-N® ammonium sulfate is a cost-efficient fertilizer because it provides two important agronomic nutrients: ammonium nitrogen and sulfate sulfur.

- **Less susceptible to nitrogen loss from leaching**
  The ammonium ion (NH_4^+) has a positive charge and is held by the negatively charged soil.



- **Less susceptible to nitrogen loss from volatilization**
  Ammonia losses are minimal on most soils, which makes ammonium sulfate an excellent nitrogen source for surface applications, even without incorporation.
- **Less susceptible to nitrogen loss from denitrification.**
  The ammonium form of nitrogen is not subject to gas losses under waterlogged conditions.
- **Higher nutrient efficiency**
  Nitrogen and sulfur have similar behavior within the plant and by correcting a sulfur deficiency, nitrogen efficiency may increase. Phosphate and micronutrient availability may also be improved with Honeywell Sulf-N ammonium sulfate.

- **Sulfur Advantage**
  Sulfur deficiencies have become more common due mainly to the use of sulfur-free fertilizers, higher crop yields and reduced sulfur emissions. Like nitrogen, microorganisms will immobilize sulfur in order to balance their carbon to sulfur ratio. This can also contribute to a sulfur deficiency, especially under conservation tillage practices where crop residues accumulate on the soil surface.


Corn


Cotton


Alfalfa


Pasture


Wheat


Rice

Sulfur deficiencies can be visually observed. Plants deficient in sulfur show a pale green coloring of younger leaves—not to be confused with nitrogen deficiency found on older leaves.

Photos: The Sulphur Institute

- **Higher profitability**
  The use of Honeywell Sulf-N® ammonium sulfate has an impact on both yield and quality of crops. The following table shows return on investment for various crops, based on university yield data.

Crop response and economic returns to sulfur can be high

Crop	Yield Increase (@24 lbs S/A)	Net Return ($/A)	Crop Value	State (# Trials)
Corn	12 bu	$ 38	$3.75/bu	OH (3)
Wheat	12 bu	$ 65	$6.00/bu	MD (4)
Cotton (lint)	319 lb	$153	$0.50/lb	GA (8)
Alfalfa	0.88 ton	$ 99	$120/ton	MN (45)
Warm Grasses	0.50 ton	$ 31	$75/ton	FL (3)
Cool Grasses	0.30 ton	$ 16	$75/ton	KS (9)
Potatoes	14.6 cwt	$ 97	$7.00/cwt	IN (4)
Rice	15 bu	$ 68	$5.00/bu	AR (2)
Canola	410 lb	$ 75	$0.20/lb	ND (2)

Source: The Sulphur Institute and Honeywell

According to The Sulphur Institute, “Typical returns on fertilizer investment are $3.00 for each dollar invested. With sulphur, returns are $9.00 to $10.00 for each dollar invested.”

Research

Soil and tissue tests also help identify where there is a crop need for sulfur. Research has determined that crops will likely respond to added sulfur under these conditions:

- CEC < 8 (e.g. sandy loam or lighter soil texture)
- organic matter < 2%
- well drained
- no manure
- tissue S level < 0.20% (most crops)
- reduced tillage