

ESTIMATED PHYSICAL CHARACTERISTICS OF FERTILIZER MATERIAL



Below are some typical values for physical characteristics of common fertilizer materials. Keep in mind that these values will vary depending on the raw materials used, impurities in the product, handling techniques, etc. These are ballpark values only-they should be checked on your individual materials.

<u>Product</u>	Typical*			
	<u>Salt-out Temp. (°F)</u>	<u>Density lb/gal</u>	<u>Percent Water</u>	<u>pH</u>
28-0-0	-1	10.67	30	7.2**
32-0-0	28	11.06	20	7.2**
10-34-0	-10	11.65	37	6.0
12-0-0-26S	<20	11.04	40	7.4
10-0-0-10Zn	32	10.4	63	10.5
7-21-7	20	11.2	48	6.5
4-10-10	18	10.3	63	6.5
8-21-4-3S-.5Zn	<5	11.3	46	6.5
9-18-4-6S-.5Zn	<5	11.3	43	6.5
9-20-2-7S-.5Zn	<5	11.4	42	6.5
18-13-0-7S	<5	11.3	32	6.1
10-30-0-3S	<5	11.7	37	6.1

<u>Dry Material</u>	<u>Bulk Density lb/cu ft</u>	<u>Critical Relative Humidity</u>
Urea (granular)	44-48	72
Ammonium Nitrate (prill)	54-58	59
Ammonium Nitrate (low density)	45	59
Diammonium Phosphate	55-60	82
Monoammonium	60-65	92
Triple Superphosphate	65-75	94
Potassium Chloride (granular)	58-65	84
Potassium Chloride (soluble)	94	84
Potassium-Magnesium Sulfate	90-98	--
Ammonium Sulfate (crystal)	63-66	79
Ammonium Sulfate (granular)	47-53	79

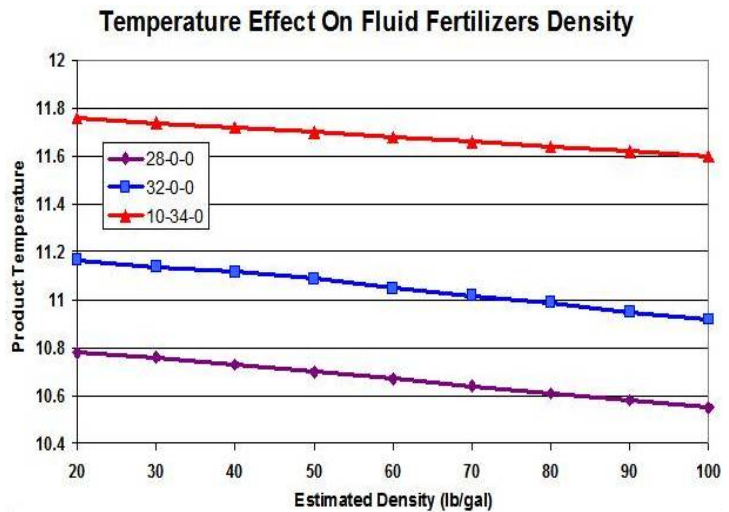
* Actual values do vary. Information presented is a guide only.

** pH of UAN may vary depending on corrosion inhibitor/amount of free ammonia used.

Temperature Effect on Density

While temperature has a small effect on the density of liquid fertilizers, the effect is relatively minor and generally is not of practical importance. However, temperature can aggravate shrink problems if the product temperature is not taken into account when taking inventory on large storage tanks.

For example, suppose that 80 degree 28-0-0 is placed in storage (density of about 10.6 lb/gal). If the product were allowed to cool to 40 degrees and inventory were taken, there would be an apparent shrink (1.3%) if it is assumed that the product still weighed 10.6 lb/gal – instead of a more correct 10.74 lb/gallon. The graph below provides an estimate of the effect of temperature on the densities of 28-0-0, 32-0-0 and 10-34-0.



Product	28-0-0	30-0-0	32-0-0	10-34-0
Temperature	-----Lb/Gal-----			
20	10.78	10.98	11.17	11.76
30	10.76	10.95	11.14	11.74
40	10.73	10.92	11.12	11.72
50	10.70	10.90	11.09	11.70
60	10.67	10.86	11.05	11.68
70	10.64	10.83	11.02	11.66
80	10.61	10.80	10.99	11.64
90	10.58	10.76	10.95	11.62
100	10.55	10.76	10.92	11.60

Verifying the Weight or Density of Liquid Fertilizer

Water has a specific gravity of 1.0 and weighs 8.34 pounds per gallon. A simple method to determine the density of a fertilizer material is to fill any container with water and weigh it (fertilizer only, without container weight). Then fill the container to exactly the same depth with the liquid fertilizer and get the fertilizer only weight. Utilizing these weights, we can determine the specific gravity (density) of the liquid.

$$\text{Specific Gravity of Fertilizer} = \frac{\text{Weight of Fertilizer}}{\text{Weight of Water}}$$

$$\text{Density of Fertilizer (lb/gal)} = \text{Specific Gravity of Fertilizer} \times 8.34$$

Example: A 5-gallon pail of water weighed 42.7 pounds after subtracting out the weight of the pail. When filled with 28% UAN, the weight of the fertilizer was 53.4 pounds.

$$\text{Specific Gravity of UAN} = 53.4 / 42.7 = 1.28$$

$$\text{Density of UAN} = 1.28 \times 8.34 = 10.67 \text{ lb/gal}$$