

# STORAGE & HANDLING



## HANDLING

*Critical relative humidity (CRH) is defined as the relative humidity of the surrounding atmosphere (at a certain temperature) at which the material begins to absorb moisture from the atmosphere and below which it will not absorb atmospheric moisture.*

In other words, it's the humidity at which the fertilizer starts to solubilize because it's taking on water. Most fertilizers' critical relative humidity drops as the temperature increases.

The below table illustrates the CRH of a variety of fertilizers at 30 degrees Celsius (86 degrees Fahrenheit).

FUSN's CRH is similar to Urea, DAP, MAP and MOP. As a result, FUSN handles and responds consistent with these and familiar fertilizers.

**Critical Relative Humidity Table**

Fertilizer	Critical Relative Humidity
FUSN™	65-70%
Urea (46-0-0)	70%
AN (34-0-0)	55%
CAN (25-0-0)	55%
Ammonium Sulfate (21-0-0)	75%
DAP (18-46-0)	70%
MAP (11-52-0)	70%
MOP (0-0-60)	70%
SOP (0-0-50)	75%
Sodium Nitrate (16-0-0)	72%
Nitrate NPK (20-10-10)	55%
Sulfate NPK (13-13-13)	70%

Source: IFDC

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The below chart represents the measurement of hygroscopicity (laboratory moisture absorption test) – the degree to which fertilizers will absorb moisture from the atmosphere. This is important when considering the environmental conditions under which a bulk pile can be stored as well as flowability during handling and field applications.

The test is done in laboratory conditions where the temperature is 30 degrees Celsius (86 degrees Fahrenheit) and 80% humidity for a period of 72 hours.

FÜSN™ performs better than ammonium nitrate across the board and on par with urea in the moisture penetration/absorption (this is the formation of a “cap” on the material), but FÜSN will struggle to retain its granule integrity in hot and humid environments.

Similar to critical relative humidity, the cooler the climate the less susceptible it is to high humidity.

### Moisture Absorption Penetration Test

Fertilizer Type	Grade	Moisture Absorption (mg/cm <sup>2</sup> )	Moisture Penetration (cm)	Moisture-Holding Capacity		Granule Integrity Wetted Area
				mg/cm <sup>3</sup>	%	
FÜSN™	26-0-0-14s	369.5	20	18.5	1.85	Fair
Prilled ammonium nitrate	34-0-0	1,000 (a)	50 (a)	20	2.2	Poor
Granular urea	46-0-0	350	15.0	23	3.0	Good
Granular ammonium sulfate	21-0-0	94	0	-	-	Excellent
Granular DAP	18-46-0	175	1.5	117	11.7	Excellent
Granular MAP	11-55-0	90	1.0	90	9.0	Excellent
Granular triple superphosphate	0-46-0	235	1.8	131	11.7	Excellent
Granular potassium chloride	0-0-60	135	2.4	56	5.4	Good

Test performed at 30° C (86° F), 80% relative humidity for 72 hours

Source: IFDC - International Fertilizer Development Center