



## Conversion Factors Needed for Common Fertilizer Calculations

*Authored by Mark Reiter, Associate Professor and Extension Soils and Nutrient Management Specialist, Eastern Shore Agricultural Research and Extension Center, Virginia Tech*

### Introduction

The world is a big place and farmers, industry, government, and others likely use different units, oxidation states, and measurements when calculating and reporting nutrient use for farming systems. The following table outlines some of the most common conversions needed for nutrient management. For instance, to convert K to K<sub>2</sub>O, you would multiply your K number by 1.2051. So, a fertilizer being reported as 49.8% K is also commonly reported as 49.8% × 1.2051 = 60% K<sub>2</sub>O. Therefore, you are equally correct to report muriate of potash (KCl) fertilizer as 49.8% K or 60% K<sub>2</sub>O, as long as you have the correct unit represented. However, note that fertilizer law generally states that certain oxidation states should be reported for certain nutrients (i.e. K<sub>2</sub>O must be used on Virginia fertilizer labels).

Table 1. Common fertilizer conversions needed for nutrient management calculations.

Column 1: Conversion	Multiply by	Column 2: Multiplication Value
<b>Nutrient Sources</b>		
P to P <sub>2</sub> O <sub>5</sub>	Multiply P by	2.2910
P <sub>2</sub> O <sub>5</sub> to P	Multiply P <sub>2</sub> O <sub>5</sub> by	0.4365
K to K <sub>2</sub> O	Multiply K by	1.2051
K <sub>2</sub> O to K	Multiply K <sub>2</sub> O by	0.8301
KCl to K	Multiple KCl by	0.5244
KCl to Cl	Multiply KCl by	0.4756
K <sub>2</sub> SO <sub>4</sub> to K	Multiply K <sub>2</sub> SO <sub>4</sub> by	0.4487
Mg to MgO	Multiply Mg by	1.6578
MgO to Mg	Multiply MgO by	0.6032
MgCO <sub>3</sub> to MgO	Multiply MgCO <sub>3</sub> by	0.4782
MgO to MgCO <sub>3</sub>	Multiply MgO by	2.0913
MgSO <sub>4</sub> to Mg	Multiply MgSO <sub>4</sub> by	0.2020
MgCO <sub>3</sub> to CaCO <sub>3</sub>	Multiply MgCO <sub>3</sub> by	1.1867
CaO to Ca	Multiply CaO by	0.7147
Ca to CaO	Multiply Ca by	1.3992
CaCO <sub>3</sub> to MgCO <sub>3</sub>	Multiply CaCO <sub>3</sub> by	0.8426

<b>Column 1: Conversion</b>	<b>Multiply by</b>	<b>Column 2: Multiplication Value</b>
CaCO <sub>3</sub> to CaO	Multiply CaCO <sub>3</sub> by	0.5603
K <sub>2</sub> SO <sub>4</sub> to S	Multiply K <sub>2</sub> SO <sub>4</sub> by	0.1840
CaSO <sub>4</sub> to Ca	Multiply CaSO <sub>4</sub> by	0.2938
CaSO <sub>4</sub> to S	Multiply CaSO <sub>4</sub> by	0.2350
SO <sub>4</sub> to S	Multiply SO <sub>4</sub> by	0.3339
S to SO <sub>4</sub>	Multiply S by	2.9963
NaCl to Cl	Multiply NaCl by	0.6066
N to NH <sub>3</sub>	Multiply N by	1.2158
N to KNO <sub>3</sub>	Multiply N by	7.2162
NH <sub>3</sub> to N	Multiply NH <sub>3</sub> by	0.8225
N to (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	Multiply N by	4.7160
(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> to N	Multiply (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> by	0.2120
(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> to S	Multiply (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> by	0.2427
N to NH <sub>4</sub> NO <sub>3</sub>	Multiply N by	2.8571
NH <sub>4</sub> NO <sub>3</sub> to N	Multiply NH <sub>4</sub> NO <sub>3</sub> by	0.3500
<b>Concentration</b>		
Parts per million (ppm) to pounds per acre (lbs./acre)	Multiply ppm by	2.0
Pounds per acre (lbs./acre) to parts per million (ppm)	Multiply lbs./acre by	0.5
Percent to gram per kilogram	Multiply percent by	10
Gram per kilogram to percent	Multiply gram per kilogram by	0.1
<b>Length</b>		
Mile to kilometer	Multiply mile by	1.609
Kilometer to mile	Multiply kilometer by	0.621
Foot to meter	Multiply foot by	0.304
Meter to foot	Multiply meter by	3.28
<b>Area</b>		
Acre to hectare	Multiply acre by	0.405
Hectare to acre	Multiply hectare by	2.47
Square foot to square meter	Multiply square foot by	0.0929
Square meter to square foot	Multiply square meter by	10.76

<b>Column 1: Conversion</b>	<b>Multiply by</b>	<b>Column 2: Multiplication Value</b>
<b>Volume</b>		
Gallon to liter	Multiply gallon by	3.78
Liter to gallon	Multiply liter by	0.265
Quart to liter	Multiply quart by	0.946
Liter to quart	Multiply liter by	1.057
<b>Mass</b>		
Pound to gram	Multiply pound by	454
Gram to pound	Multiply gram by	0.00220
Pound to kilogram	Multiply pound by	0.454
Kilogram to pound	Multiply kilogram by	2.205
U.S. ton to tonne	Multiply U.S. ton by	0.907
Tonne to U.S. ton	Multiply tonne by	1.102
<b>Yield and Rate</b>		
Pound per acre to kilogram per hectare	Multiply pound per acre by	1.12
Kilogram per hectare to pound per acre	Multiply kilogram per hectare to	0.893
Bushel per acre (bu/acre) for 60 lb. bushel to kilogram per hectare	Multiply bu/acre by	67.19
Bushel per acre (bu/acre) for 56 lb. bushel to kilogram per hectare	Multiply bu/acre by	62.71
Bushel per acre (bu/acre) for 48 lb. bushel to kilogram per hectare	Multiply bu/acre by	53.75
Gallon per acre to liter per hectare	Multiply gallon per acre by	9.35
Liter per hectare to gallon per acre	Multiply liter per hectare by	0.107
<b>Temperature</b>		
Fahrenheit (°F) to Celsius (°C)	Multiply Fahrenheit by	$5/9 \times (°F - 32)$
Celsius (°C) to Fahrenheit (°F)	Multiply Celsius by	$(9/5 \times °C) + 32$

## References

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American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America. 2020. "Chapter 7: Units and Measurements." *Publications Handbook & Style Manual*. Madison, WI.

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