

## ◉ WATER SOLUBLE FERTILIZER ◉

Water soluble fertilizer is fast-acting which completely soluble in water with no residues. Crops can absorb the nutrients directly by roots and foliage. Water soluble fertilizer's absorption rate is doubled than other common fertilizers', which can reach 80% - 90% to achieve effective nutrients utilization.

Water soluble fertilizer can supply rich & balanced nutrients to meet the needs for fast growing of high-yielding crops. It can be used in drip irrigation system to save up 30% water usage.

Various types of water soluble fertilizer, such as chlorine-based, sulphur-based, urea-based and nitrate-based, can fulfill the needs for different soil condition, growing period and fertilization method.

Medium Element (Ca, Mg, S) and Trace Element (Fe, Zn, Cu, Mn, B, Mo) or (EDTA-Fe, EDTA-Zn, EDTA-Cu, EDTA-Mn) can be added as special using fertilizers.



|                  |                                                   |      |         |
|------------------|---------------------------------------------------|------|---------|
| CAS NO.          | 66455-26-3                                        |      |         |
| CHEMICAL FORMULA | N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O |      |         |
| HS CODE          | Gross-weight less than 10kgs Per package          | 3105 | 1000.90 |
|                  | Gross-weight more than 10kgs Per package          | 3105 | 2000    |

### Water Soluble NPK Fertilizer Typical Formulations:

|                |                                                                                                                                                                        |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NPK Balance    | NPK 21-21-21 NPK 20-20-20 NPK 19-19-19 NPK 18-18-18 etc.                                                                                                               |
| High-nitrogen  | NPK 30-10-10 NPK 42-05-03 NPK 28-14-14 etc.                                                                                                                            |
| High-phosphate | NPK 13-40-13 NPK 10-52-10 NPK 15-30-15 NPK 12-36-12<br>NPK 15-36-15 NPK 10-55-10 NPK 15-45-10 NPK 03-37-37 etc.                                                        |
| High-potash    | NPK 12-12-36 NPK 10-10-40 NPK 05-15-45 NPK 12-03-43<br>NPK 15-05-30 NPK 12-08-40 NPK 10-10-30 NPK 15-15-30<br>NPK 16-08-24 NPK 03-37-37 NPK 15-05-30 NPK 10-20-30 etc. |

### Commonly Used Water Soluble Fertilizers:

|           |                                                                                               |
|-----------|-----------------------------------------------------------------------------------------------|
| Complexed | MAP 12-61-0 NOP 13.5-0-46 MKP 0-52-34 CAN15.5-0-0+18.8Ca<br>SOP 0-0-52 SOP 0-0-50 UREA 46-0-0 |
|-----------|-----------------------------------------------------------------------------------------------|

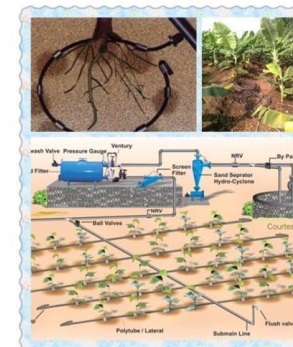
## ◉ FERTILIZATION METHOD OF WATER SOLUBLE FERTILIZER ◉

### DRIP IRRIGATION

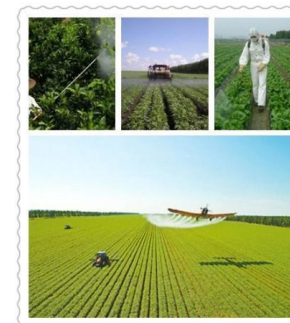
Drip irrigation, also known as trickle irrigation or micro irrigation or localized irrigation, is an irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters. It is done through narrow tubes that deliver water directly to the base of the plant. Drip irrigation is the most efficient method of irrigating. While sprinkler systems are around 75-85% efficient, drip systems typically are 90% or higher.

Drip irrigation works by applying water slowly, directly to the soil. The high efficiency of drip irrigation results from two primary factors. The first is that the water soaks into the soil before it can evaporate or run off. The second is that the water is only applied where it is needed, (at the plant's roots) rather than sprayed everywhere. So fertilizer and nutrient loss is minimized due to localized application and reduced leaching.

Drip irrigation is almost invariably used to apply water soluble fertilizers and used especially for high value crops such as fruits and vegetables.



### FOLIAR SPRAYING



Foliar spraying is a technique of feeding plants by applying liquid fertilizer directly to their leaves. Plants can absorb nutrients through the leaves, foliar nutrition can supplement the parts that can not absorb enough from the soil by the plant roots. Foliar spraying of macronutrients can help plants recover from temporary stress due to moisture problems, pests or disease. Foliar spraying has been shown to avoid the problem of leaching-out in soils and prompts a quick reaction in the plant. Of the micronutrients, Foliar spraying of phosphorus, zinc and iron brings the greatest benefit in comparison with addition to soil where phosphorus becomes fixed in a form inaccessible to the plant and where zinc and iron are less available.

Foliar fertilizers are applied directly to leaves. The method is almost invariably used to apply water soluble fertilizers and used especially for high value crops such as fruits and vegetables.

Foliar spraying become soil applications if excess solution is applied or if rain falls shortly after application. This results in inadequate absorption of the nutrient by the foliage and loss of time, machinery use and labor for the application of the material. However, it is not a complete loss as some of the material that gets to the soil will be absorbed by the plant roots.

### HYDROPONICS IN GREENHOUSE

Hydroponics is the method of growing plants without soil, using mineral nutrient solutions in a water solvent. Terrestrial plants may be grown with only their roots exposed to the mineral solution, or the roots may be supported by an inert medium, such as perlite or gravel. The nutrients in hydroponics can be from fish waste, duck manure, or fertilizer nutrients.

Hydroponics is almost invariably used to apply water soluble fertilizers and used especially for high value crops such as fruits, vegetables and flowers.



◉ NPK COMPOUND / COMPLEX FERTILIZER ◉

NPK Compound/Complex Fertilizers which contain Nitrogen(N), Phosphate(P2O5) and Potassium(K2O) usually are produced by mixing straight fertilizers. In some cases, chemical reactions occur between the two or more components. In order to extend the fertilizer efficiency period and easy for application, transportation & storage, compound fertilizers which contain insoluble matters are generally made into granular by granulation process.

Granular Compound Fertilizer is normally applied into the soil directly. Nutrients dissolved in the soil can be absorbed by crops roots. Most granular fertilizers are quick-released and fast-acting.



Formulation can be adjusted according to natural condition of local soil, variety of the crops, different growing periods and application methods. Chlorine-based, sulphur-based, urea-based and nitrate-based formulations are available.

Medium Element (Ca, Mg, S) and Trace Element (Fe, Zn, Cu, Mn, B, Mo) or (EDTA-Fe, EDTA-Zn, EDTA-Cu, EDTA-Mn) can be added as special using fertilizers.

|                  |                                          |                                                   |
|------------------|------------------------------------------|---------------------------------------------------|
| CAS NO.          |                                          | 66455-26-3                                        |
| CHEMICAL FORMULA |                                          | N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O |
| HS CODE          | Gross-weight less than 10kgs Per package | 3105 1000.90                                      |
|                  | Gross-weight more than 10kgs Per package | 3105 2000                                         |

NPK Compound/Complex Granular Fertilizer Typical Formulations:

|                |                                                                                                                 |
|----------------|-----------------------------------------------------------------------------------------------------------------|
| NPK Balance    | NPK 14-14-14 NPK 15-15-15 NPK 16-16-16 NPK 17-17-17                                                             |
| High-nitrogen  | NPK 20-10-10 NPK 30-09-09 NPK 25-05-05 NPK 22-06-12<br>NPK 19-12-19 NPK 18-18-05 NPK 16-16-08 NPK 27-12-18 etc. |
| High-phosphate | NPK 12-24-12 NPK 11-22-16 NPK 14-23-14 NPK 18-18-05<br>NPK 10-20-20 NPK 16-16-08 NPK 10-20-10 NPK 08-22-20 etc. |
| High-potash    | NPK 12-12-17 NPK 12-11-18 NPK 15-05-20 NPK 10-20-20<br>NPK 19-12-19 NPK 27-12-18 NPK 12-08-16 NPK 13-13-20 etc. |

◉ BINARY COMPOUND / COMPLEX FERTILIZER ◉

Binary (NP, NK, PK) Compound/Complex Fertilizers which contain two components of Nitrogen(N), Phosphate(P2O5) and Potassium(K2O), usually be produced by mixing straight fertilizers. In some cases, chemical reactions occur between the two or more components. In order to extend the fertilizer efficiency period and easy to application, transportation & storage, binary fertilizers which contain insoluble matters are generally made in to granular by granulation process.



Medium Element (Ca, Mg, S) and Trace Element (Fe, Zn, Cu, Mn, B, Mo) or (EDTA-Fe, EDTA-Zn, EDTA-Cu, EDTA-Mn) can be added as special using fertilizers.

|                  |               |                                                   |
|------------------|---------------|---------------------------------------------------|
| CAS NO.          |               | 66455-26-3                                        |
| CHEMICAL FORMULA |               | N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O |
| HS CODE          | NP Fertilizer | 3105 5900                                         |
|                  | PK Fertilizer | 3105 6000                                         |
|                  | NK Fertilizer | 3105 9000                                         |

Binary Compound/Complex Granular Fertilizer Typical Formulations:

|               |                                                                                                    |
|---------------|----------------------------------------------------------------------------------------------------|
| NP Fertilizer | NPK 20-20-00 NPK 23-23-00 NPK 16-20-00 NPK 23-21-00<br>NPK 18-18-00 NPK 30-06-00 NPK 17-44-00 etc. |
| NK Fertilizer | NPK 19-00-19 NPK 21-00-21 NPK 18-00-27 NPK 25-00-21<br>NPK 19-00-03 NPK 15-00-20 etc.              |
| PK Fertilizer | NPK 00-20-25 NPK 00-23-19 NPK 00-08-35 etc.                                                        |



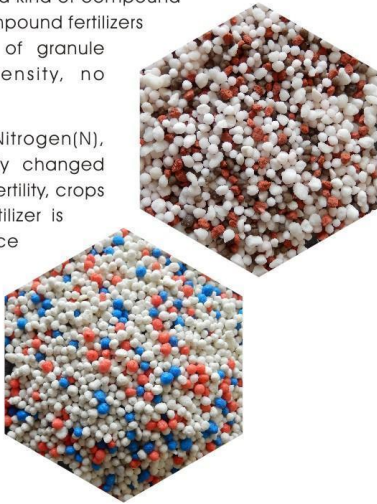
◉ BULK BLENDING (BB) FERTILIZER ◉

Bulk Blending Fertilizer (BB Fertilizer/Mixture of Fertilizer) is a kind of compound granular fertilizer mixed by several single fertilizers or compound fertilizers according to certain proportion. It has characters of granule uniformity, less water, moderate granule intensity, no agglomeration, easy to use and low cost.

The formulation of BB Fertilizer which contains Nitrogen(N), Phosphate(P2O5) and Potassium(K2O) can be flexibly changed according to the crop's nutrition requirement, local soil fertility, crops growing levels and other conditions, therefore BB Fertilizer is more scientific and targeted especially for balance fertilization.

The nutrients concentration of BB Fertilizer is usually higher than common Compound/Complex Fertilizers. BB Fertilizer also can mixed by derivatives of urea as slow-released fertilizer or coated urea as control-released fertilizer.

Medium Element (Ca, Mg, S) and Trace Element (Fe, Zn, Cu, Mn, B, Mo) or (EDTA-Fe, EDTA-Zn, EDTA-Cu, EDTA-Mn) can be added as special using fertilizers.



|                  |                                               |                                                   |
|------------------|-----------------------------------------------|---------------------------------------------------|
| CAS NO.          |                                               | 66455-26-3                                        |
| CHEMICAL FORMULA |                                               | N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O |
| HS CODE          | NPK: Gross-weight less than 10kgs Per package | 3105 1000.90                                      |
|                  | NPK: Gross-weight more than 10kgs Per package | 3105 2000                                         |
|                  | NP Fertilizer                                 | 3105 5900                                         |
|                  | PK Fertilizer                                 | 3105 6000                                         |
|                  | NK Fertilizer                                 | 3105 9000                                         |

BB Granular Fertilizer Typical Formulations:

|                |                                                          |
|----------------|----------------------------------------------------------|
| High-nitrogen  | NPK 30-04-08 NPK 28-28-00 NPK 20-20-00 NPK19-38-00 etc.  |
| High-phosphate | NPK 19-38-00+7S NPK 14-28-14 NPK 14-23-14 etc.           |
| High-potash    | NPK 13-13-21 NPK 17-08-25 NPK 18-07-30 NPK 16-09-18 etc. |

◉ CHLORINE-BASED & SULPHUR-BASED COMPOUND FERTILIZERS ◉

CHLORINE-BASED COMPOUND FERTILIZERS

Refers to the potassium content of the compound fertilizers present in the source of potassium chloride. Chlorine- based compound fertilizers can be divided into single-chlorine type & double-chlorine type. Single-chlorine type refers to the potassium content is from potassium chloride and nitrogen content is from urea without chlorine ions; Double-chlorine type refers to the potassium content is from potassium chloride and nitrogen content is from ammonium chloride.

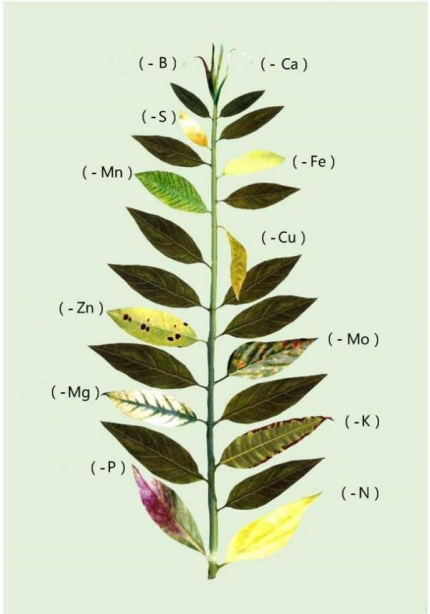
SULFUR-BASED COMPOUND FERTILIZERS

Refers to the potassium content of the compound fertilizers present in the source of potassium sulfate or potassium chloride removed chloride ions by dechlorination process, also the content of chloride ions of sulfur-based compound fertilizers can not exceed 3%, otherwise it is chlorine-based compound fertilizer.

THE PLANTS WHICH ARE SENSITIVE TO USE CHLORIDE-BASED COMPOUND FERTILIZER

Many plants are sensitive to the chloride ion, it is essential to use chloride-free fertilizers or caution to use chloride-based compound fertilizers, which decreased yield and quality of the crops, those plants is commonly referred sensitive-chlorine plants. When chloride ions content in sensitive-chlorine plants are more, it will effect the sugar convert to starch then cause the starch content of roots and tubers reduce. Chloride ions can promote carbohydrate to hydrolysis, such as watermelon, beets, grapes will reduce the sugar content. High chloride ions content will affect tobacco flammability, easy to turn off the cigarette. High chloride ions content often cause harm to sensitive plants seedling crop. Tobacco, potato, sweet potato, sugar cane, watermelon, grapes, oranges, beets, apples, tea, cabbage, peppers, lettuce, spinach, etc. are sensitive-chlorine plants. Chlorine will adversely affect the Solanaceae crops. Soybeans, green beans anti-chlorine performance is weak.

◉ NUTRIENT DEFICIENCY DISEASE STATE OF PLANT LEAF ◉



## ◉ UREA \ CARBAMIDE ◉

Urea (Carbamide/ Urea solution/ USP Grade Carbamide) is easily soluble in water and used as a neutral quick-released high concentration of nitrogen fertilizer. It is hygroscopic in air and easily caking. Urea is popularly used in NPK compound fertilizers & BB fertilizers as a basic raw material, it can also be coated with sulphur or polymer as slow-released or control-released fertilizer. Long-term application of urea does not remain any harmful substances in the soil.

But urea contains small amount of biuret in granulation process, when biuret content exceeds 1%, urea can not be used as seeding and foliar fertilizer.

Because of the high nitrogen concentration in urea, it is very important to achieve an even spread. Drilling must not occur on contact with or close to seed, due to the risk of germination damage. Urea dissolves in water for application as a spray or through irrigation systems.



|                     |                                                                                                                                           |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| CAS NO.             | 57-13-6                                                                                                                                   |
| EINECS NO.          | 200-315-5                                                                                                                                 |
| HS CODE             | 3102 1000                                                                                                                                 |
| CHEMICAL FORMULA    | CO(NH <sub>2</sub> ) <sub>2</sub>                                                                                                         |
| MOLAR MASS          | 60.06 g/mol                                                                                                                               |
| ODOR                | Odorless                                                                                                                                  |
| DENSITY             | 1.32 g/cm <sup>3</sup>                                                                                                                    |
| MELTING POINT       | 133 to 135°C                                                                                                                              |
| SOLUBILITY IN WATER | 1079 g/L (20 °C)\ 1670 g/L (40 °C)\ 2510 g/L (60 °C)\ 4000 g/L (80 °C)                                                                    |
| STORAGE             | Store in 20 °C cool, dry, well ventilated warehouse. Avoid insolation or rain. Stored separately and kept away from poisonous substances. |

## ◉ SPECIFICATIONS OF UREA \ CARBAMIDE ◉

| Item                  | PRILLED UREA                                           | GRANULAR UREA      |
|-----------------------|--------------------------------------------------------|--------------------|
| Grade                 | Agricultural Grade                                     | Agricultural Grade |
| Purity                | 99.0% Min                                              | 99.0% Min          |
| Total Nitrogen (as N) | 46.0 % Min                                             | 46.0 % Min         |
| Biuret                | 1.0% Max                                               | 1.0% Max           |
| Moisture              | 0.5% Max                                               | 0.5% Max           |
| Appearance            | White Prill                                            | White Granular     |
| Particle Size         | 0.85-2.8mm 90%min                                      | 2-4.75mm 90%min    |
| Packing               | 25KG/50KG/1MT Jumbo PP plastic woven with PE inner bag |                    |

## ◉ AMMONIUM SULPHATE ◉

Ammonium sulphate \ SOA \ AS is an inorganic salt with a number of commercial uses.

The primary use of ammonium sulphate is as a fertilizer for alkaline soil. It is quick release & fast acting, easily hygroscopic & caking. Normally it is used as seed fertilizer, base dressing & topdressing directly, particularly suitable for soil lack of sulfur, low chlorine tolerance crops, sulfurphilic crops. It is also suitable for the rice seedling, the growth of tea, grass & vegetables.

The ammonium ion is released in the soil and forms a small amount of acid, which lowers the pH balance of the soil, contributes essential nitrogen for plant growth. The main disadvantage of using ammonium sulphate is its low nitrogen content. Long-time application of ammonium sulphate will cause soil acidification.

Ammonium sulphate\SOA is also used as an agricultural spray adjuvant for water-soluble insecticides, herbicides, and fungicides. Therefore, it functions as bind iron and calcium cations that presented in both well water and plant cells. It is particularly effective as an adjuvant for 2,4-D (amine), glyphosate, and glufosinate herbicides.



|                     |                                                                                                                                                                                                              |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAS NO.             | 7783-20-2                                                                                                                                                                                                    |
| EINECS NO.          | 231-984-1                                                                                                                                                                                                    |
| HS CODE             | 3102 2100                                                                                                                                                                                                    |
| CHEMICAL FORMULA    | (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>                                                                                                                                                              |
| MOLAR MASS          | 132.14 g/mol                                                                                                                                                                                                 |
| ODOR                | Odorless                                                                                                                                                                                                     |
| DENSITY             | 1.769 g/cm <sup>3</sup> (20 °C)                                                                                                                                                                              |
| MELTING POINT       | 238 to 280°C decompose                                                                                                                                                                                       |
| SOLUBILITY IN WATER | 70.6 g/100mL (0 °C)\ 74.4 g/100mL (20 °C)\ 103.8 g/100mL (100 °C)                                                                                                                                            |
| STORAGE             | Store in cool, dry, well ventilated warehouse. Avoid insolation or rain. Kept away from fire and heat, stored separately from acid and alkali material substances. Handle careful to prevent package damage. |

## ◉ SPECIFICATION OF AMMONIUM SULPHATE \ SOA ◉

| Item                                            | Caprolactam Grade                                      | Steel Grade Granular     |
|-------------------------------------------------|--------------------------------------------------------|--------------------------|
| Purity                                          | 99.0% Min                                              | 98.0% Min                |
| Total Nitrogen                                  | 21.0% Min                                              | 20.5% Min                |
| Sulphur (as S)                                  | 24.0% Min                                              | 23.5% Min                |
| Moisture                                        | 0.2% Max                                               | 1.5% Max                 |
| Water Insoluble Matter                          | 0.02% Max                                              | 0.5% Max                 |
| Free Acid ( as H <sub>2</sub> SO <sub>4</sub> ) | 0.01% Max                                              | 0.05% Max                |
| Iron (as Fe)                                    | 0.007% Max                                             | /                        |
| Heavy Metal (as Pb)                             | 0.005% Max                                             | /                        |
| Arsenic (as As)                                 | 0.0005% Max                                            | /                        |
| PH Value                                        | 3.0-5.0                                                |                          |
| Appearance                                      | Colorless or Yellowish Crystalline                     | White Extrusion Granular |
| Particle Size                                   | 0-4mm                                                  | 2-5mm 90% Min            |
| Packing                                         | 25KG/50KG/1MT Jumbo PP plastic woven with PE inner bag |                          |

## ◉ POTASSIUM SULPHATE \ SOP ◉

SOP (Potassium Sulphate or Potassium Sulfate) is easily soluble in water and is more popular fertilizer using for seed, flower, fruit period crops. SOP does not contain chloride, which can be harmful to some crops. SOP is preferred for these crops, which include tobacco and some fruits and vegetables. Crops that are less sensitive may still require SOP for optimal growth if the soil accumulates chloride from irrigation water.

SOP powder is also the source of potassium content to produce NPK Compound Fertilizer. If the content of chloride ions of compound fertilizers required not to exceed 3%, this kind of compound fertilizer is named sulphur-based compound fertilizer which is suitable for application to chlorine-sensitive plants, such as tobacco, potato, sweet potato, sugar cane, watermelon, grapes, oranges, beets, apples, tea, cabbage, peppers, lettuce, spinach and beans.

SOP Granular is made by extrusion granulation process, easily soluble in water and is more popular fertilizer using for seed, flower, fruit period crops directly.



|                       |                                                                                                                  |
|-----------------------|------------------------------------------------------------------------------------------------------------------|
| CAS NO.               | 7778-80-5                                                                                                        |
| EINECS NO.            | 231-915-5                                                                                                        |
| HS CODE               | Gross-weight less than 10kgs Per package: 3105 1000.90<br>Gross-weight is more than 10kgs Per package: 3104 3000 |
| CHEMICAL FORMULA      | $K_2SO_4$                                                                                                        |
| MOLAR MASS            | 174.259 g/mol                                                                                                    |
| ODOR                  | Odorless                                                                                                         |
| DENSITY               | 2.66 g/cm <sup>3</sup>                                                                                           |
| MELTING/BOILING POINT | 1069°C / 1689°C                                                                                                  |
| SOLUBILITY IN WATER   | 111 g/L (20 °C)\ 120g/L (25 °C)\ 240 g/L (100 °C)                                                                |
| STORAGE               | Store in dry, well ventilated warehouse. Avoid insolation or rain.                                               |

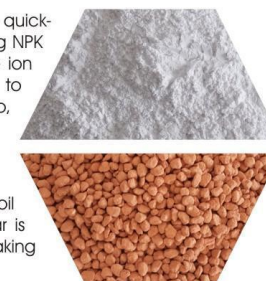
## ◉ SPECIFICATION OF POTASSIUM SULPHATE \ SOP ◉

| Item                                           | SOP SOLUBLE POWDER                                 |                               | SOP EXTRUSION GRANULAR        |                               |
|------------------------------------------------|----------------------------------------------------|-------------------------------|-------------------------------|-------------------------------|
|                                                | 0-0-52 (52% K <sub>2</sub> O)                      | 0-0-50 (50% K <sub>2</sub> O) | 0-0-52 (52% K <sub>2</sub> O) | 0-0-50 (50% K <sub>2</sub> O) |
| Water Soluble Potash (as K <sub>2</sub> O)     | 52.0% Min                                          | 50.0% Min                     | 52.0% Min                     | 50.0% Min                     |
| Sulphur (as S)                                 | 18.0% Min                                          | 17.0% Min                     | 18.0% Min                     | 17.0% Min                     |
| Moisture                                       | 1.0% Max                                           | 1.0% Max                      | 2.0% Max                      | 2.0% Max                      |
| Water Soluble                                  | 100%                                               | 97% min                       | 100%                          | 97% min                       |
| Free Acid (as H <sub>2</sub> SO <sub>4</sub> ) | 1.5% Max                                           | 1.5% Max                      | 1.5% Max                      | 1.5% Max                      |
| Total Chloride (as Cl)                         | 1.5% Max                                           | 1.5% Max                      | 1.5 % Max                     | 1.5% Max                      |
| Calcium (as Ca)                                | 0.1% Max                                           | 0.1% Max                      | 0.1% Max                      | 0.1% Max                      |
| Iron (as Fe)                                   | 0.1% Max                                           | 0.1% Max                      | 0.1% Max                      | 0.1% Max                      |
| Heavy Metal (as Pb)                            | 0.01% Max                                          | 0.01% Max                     | 0.01% Max                     | 0.01% Max                     |
| Ph Value                                       | 3.0-5.0                                            |                               | 3.0-5.0                       |                               |
| Appearance                                     | White Powder                                       |                               | White Extrusion Granular      |                               |
| Particle Size                                  | /                                                  |                               | 2.0-4.75mm 90%min             |                               |
| Packing                                        | 9.5/9.9/25/50KG PP plastic woven with PE inner bag |                               |                               |                               |

## ◉ POTASSIUM CHLORIDE \ KCL \ MOP ◉

Potassium chloride\ KCL\ MOP) is easily soluble in water and used as a quick-released and high effective potash fertilizer. It is also popular in producing NPK compound fertilizers as a basic raw material. But KCL contains chloride ion and can not be used for chlorine- sensitive crops, which contributes to decreasing yield and quality. Chlorine- sensitive crops include tobacco, potato, sweet potato, sugar cane, watermelon, grapes, oranges, beets, apples, tea, cabbage, peppers, lettuce, spinach, solanaceae crops, etc.

Also KCL can not be used in saline-alkaline land otherwise it will increase soil salinity. KCL powder is hygroscopic in air and easy caking. KCL granular is made by extrusion process and dyed with hot steam, so it has anti-caking effect for easy storage and transportation.



|                       |                                                                                                                                                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| CAS NO.               | 7447-40-7                                                                                                                                          |
| EINECS NO.            | 231-211-8                                                                                                                                          |
| HS CODE               | Gross-weight less than 10kgs Per package: 3105 1000.90<br>Gross-weight more than 10kgs Per package: 3104 2090                                      |
| CHEMICAL FORMULA      | KCL                                                                                                                                                |
| MOLAR MASS            | 74.5513 g/mol                                                                                                                                      |
| ODOR                  | Odorless                                                                                                                                           |
| DENSITY               | 1.984 g/cm <sup>3</sup>                                                                                                                            |
| MELTING/BOILING POINT | 770°C / 1420°C                                                                                                                                     |
| SOLUBILITY IN WATER   | 28.1 g/100mL (0 °C)\ 34.4 g/100mL (20 °C)\ 56.7 g/100mL (100 °C)                                                                                   |
| STORAGE               | Store in dry, well ventilated warehouse. Avoid insolation or rain. Kept away from water and moisture, stored separately from poisonous substances. |

## ◉ SPECIFICATION OF POTASSIUM CHLORIDE \ KCL \ MOP ◉

| Item                                       | KCL 0-0-60 POWDER                                  | KCL 0-0-60 GRANULAR             |
|--------------------------------------------|----------------------------------------------------|---------------------------------|
| Purity                                     | 98.0% Min                                          | 98.0% Min                       |
| Water Soluble Potash (as K <sub>2</sub> O) | 60.0% Min                                          | 60.0% Min                       |
| Moisture                                   | 2.0% Max                                           | 2.0% Max                        |
| Water Insoluble Matter                     | 0.3% Max                                           | 0.3% Max                        |
| Sodium (as NaCl)                           | 2.0% Max                                           | 2.0% Max                        |
| Calcium+Magnesium (as Ca+Mg)               | 0.5% Max                                           | 0.5% Max                        |
| Appearance                                 | White Powder                                       | White or Red Extrusion Granular |
| Partical Size                              | /                                                  | 2.0-4.75mm 90%min               |
| Packing                                    | 9.5/9.9/25/50KG PP plastic woven with PE inner bag |                                 |

## ◉ MONOAMMONIUM PHOSPHATE \ MAP ◉

Mono-ammonium Phosphate (MAP is also known as Ammonium Dihydrogen Phosphate (ADP), used as a high effective nitrogen and phosphate – two of the macronutrients fertilizer in agriculture. It is hygroscopic in air and easily soluble in water for direct fertigation and foliar application. Also used in NPK compound fertilizers & BB fertilizers as a basic raw material. MAP does not contain chloride and are widely used for rice, wheat, corn, sorghum, cotton, fruits & vegetables.

MAP granular is produced by granulation process for base-dressing, top-dressing and broadcasting application directly. Also used in BB compound fertilizers as a basic raw material.

Mono-ammonium Phosphate (MAP can also be used as a fire-prevention agent for fabric, timber and paper, as well as a fire-prevention coating and dry powder for fire extinguisher.



|                     |                                                                                                                                    |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------|
| CAS NO.             | 7722-786-1                                                                                                                         |
| EINECS NO.          | 231-764-5                                                                                                                          |
| HS CODE             | 3105 4000                                                                                                                          |
| CHEMICAL FORMULA    | $\text{NH}_4\text{H}_2\text{PO}_4$                                                                                                 |
| MOLAR MASS          | 115.02 g/mol                                                                                                                       |
| ODOR                | Faint acid                                                                                                                         |
| DENSITY             | 1.80 g/cm <sup>3</sup>                                                                                                             |
| MELTING POINT       | 190°C                                                                                                                              |
| SOLUBILITY IN WATER | 37.4 g/100mL (20 °C)                                                                                                               |
| STORAGE             | Store in cool, dry well ventilated warehouse. Avoid insolation or rain. Stored separately and kept away from poisonous substances. |

## ◉ SPECIFICATION OF MONOAMMONIUM PHOSPHATE \ MAP ◉

| Item                                                | MAP12-61-0 POWDER                          | MAP 11-44-0 GRANULAR |
|-----------------------------------------------------|--------------------------------------------|----------------------|
| Purity                                              | 98.5% Min                                  | 98.0% Min            |
| Total Nitrogen                                      | 11.8% Min                                  | 11.0% Min            |
| Total Phosphate (as P <sub>2</sub> O <sub>5</sub> ) | 60.8% Min                                  | 44.0% Min            |
| Moisture                                            | 0.5% Max                                   | 2.0% Max             |
| PH Value                                            | 4.0~4.8                                    | 4.0~5.0              |
| Water Insoluble matter                              | 0.3% Max                                   | /                    |
| Total Chloride (as Cl)                              | 0.1% Max                                   | /                    |
| Arsenic (as As)                                     | 0.0003% Max                                | /                    |
| Heavy Metal (as Pb)                                 | 0.001% Max                                 | /                    |
| Appearance                                          | White Crystalline                          | White Granular       |
| Partical Size                                       | /                                          | 2.0-4.75mm 90%min    |
| Packing                                             | 25/50KG PP plastic woven with PE inner bag |                      |

## ◉ DIAMMONIUM PHOSPHATE \ DAP ◉

DAP (Di-ammonium Phosphate/ Diammonium hydrogen phosphate/ Ammonium phosphate dibasic/ Ammonium hydrogen phosphate/ Di-Ammonium hydrogen orthophosphate/ Diammonium Phosphate/Phosphorus ICP standard solution Fluka) is easily soluble in water and used as a high effective nitrogen and phosphate – two of the macro-nutrients fertilizer in agriculture. It is also used in producing NPK compound fertilizers & BB fertilizers as a basic raw material. DAP granular is produced by granulation process for base-dressing, top-dressing for deeply application directly. DAP does not contain chloride and is widely used for all kinds of plants and soil.

When DAP applied as plant food, it temporarily increases the soil pH, but over a long term the treated ground becomes more acidic than before upon nitrification of the ammonium. It is incompatible with alkaline chemicals because its ammonium ion is more likely to convert to ammonia in a high-pH environment. The average pH in solution is 7.5-8.



|                     |                                                                                                                                                          |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAS NO.             | 7783-28-0                                                                                                                                                |
| EINECS NO.          | 231-987-8                                                                                                                                                |
| HS CODE             | 3105 3000                                                                                                                                                |
| CHEMICAL FORMULA    | $(\text{NH}_4)_2\text{HPO}_4$                                                                                                                            |
| MOLAR MASS          | 132.06 g/mol                                                                                                                                             |
| ODOR                | Faint acid                                                                                                                                               |
| DENSITY             | 1.619 g/cm <sup>3</sup>                                                                                                                                  |
| MELTING POINT       | 155°C decomposes                                                                                                                                         |
| SOLUBILITY IN WATER | 57.5 g/100mL (0 °C)\ 106.7 g/100mL (100 °C)                                                                                                              |
| CHARACTERISTIC      | Easy decompose in wet air release ammonia convert to monoammonium phosphate                                                                              |
| STORAGE             | Store in cool, dry, well ventilated warehouse. Avoid insolation or rain. Kept away from water and moisture, stored separately from poisonous substances. |

## ◉ SPECIFICATION OF DIAMMONIUM PHOSPHATE \ DAP ◉

| Item                                                       | DAP18-46-0 GRANULAR                        |
|------------------------------------------------------------|--------------------------------------------|
| Purity                                                     | 99.0% Min                                  |
| Total Nitrogen                                             | 18.0% Min                                  |
| Total Phosphate (as P <sub>2</sub> O <sub>5</sub> )        | 46.0% Min                                  |
| Moisture                                                   | 2.0% Max                                   |
| Water Soluble Phosphate(as P <sub>2</sub> O <sub>5</sub> ) | 41.0 % Min                                 |
| PH Value                                                   | 7.8-8.2                                    |
| Appearance                                                 | Brown or Yellow Granular                   |
| Partical Size                                              | 2-4mm: 90%Min                              |
| Packing                                                    | 25/50KG PP plastic woven with PE inner bag |

## ◉ CALCIUM AMMONIUM NITRATE \ CAN ◉

Calcium Ammonium Nitrate (CAN / Calcium Nitrate Granular) is white granular which dissolves in water absolutely. It is a new type of high-efficient compound fertilizer .It contains nitrogen and calcium which can be absorbed by the crop root directly to promote crop growing quickly .

Calcium Ammonium Nitrate (CAN/Calcium Nitrate Granular) is a kind of neutral fertilizer which does not cause soil compaction and making soil loose, so it can improve the quality of soil by long-time application.

Calcium Ammonium Nitrate (CAN/Calcium Nitrate Granular) can change the PH value of the soil, reduce the active aluminum density and active phosphorus fixed rate of soil. It contains water-soluble calcium, which can promote beneficial microbial activity in the soil and improve crops resistance to diseases.

Calcium Ammonium Nitrate (CAN/Calcium Nitrate Granular) can lengthen the florescence and promote the root, stem, leaf of crops growing normally, ensuring the bright color and sugar content of the fruit.



|                  |                                                                                     |
|------------------|-------------------------------------------------------------------------------------|
| CAS NO.          | 15245-12-2                                                                          |
| EINECS NO.       | 239-289-5                                                                           |
| CHEMICAL FORMULA | $5\text{Ca}(\text{NO}_3)_2 \cdot \text{NH}_4\text{NO}_3 \cdot 10\text{H}_2\text{O}$ |
| HS CODE          | 3102 4000                                                                           |

## ◉ SPECIFICATION OF CALCIUM AMMONIUM NITRATE \ CAN ◉

| Item                           | CAN 15.5-0-0-26CAO GRANULAR             |
|--------------------------------|-----------------------------------------|
| Purity                         | 99.0% Min                               |
| Total Nitrogen                 | 15.5% Min                               |
| Ammonical Nitrogen             | 1.1% Max                                |
| Nitrate Nitrogen               | 14.4% Min                               |
| Water Soluble Calcium (as CaO) | 26.0% Min                               |
| Moisture                       | 1.0% Max                                |
| Water Insoluble Matter         | 0.2% Max                                |
| Iron (as Fe)                   | 0.005% Max                              |
| Total Chlorides (as Cl)        | 0.02 % Max                              |
| Ph Value                       | 5.6-6.8                                 |
| Appearance                     | White Granular                          |
| Particle Size                  | 2-4mm: 90%min                           |
| Packing                        | 25KG PP plastic woven with PE inner bag |

## ◉ AMMONIUM NITRATE PHOSPHATE \ ANP ◉

Ammonium Nitrate Phosphate (ANP) is white granular which easily soluble in water and easily hygroscopic in air. It is a new type of high-efficient compound fertilizer. It contains nitrogen and phosphate which can be absorbed by the crop root directly to promote crop growing quickly.

Ammonium Nitrate Phosphate (ANP) is a kind of weak acidic fertilizer which suitable for weak alkaline soils, so it can improve the PH value of soil by long-time application.

Ammonium Nitrate Phosphate (ANP) Granular is produced by spraying granulation process with Ammonium Nitrate and Monoammonium Phosphate melting mixed.



|                  |                                             |
|------------------|---------------------------------------------|
| CAS NO.          | 66455-26-3                                  |
| CHEMICAL FORMULA | $\text{N-P}_2\text{O}_5\text{-K}_2\text{O}$ |
| HS CODE          | 3105 5100                                   |

## ◉ SPECIFICATION OF AMMONIUM NITRATE PHOSPHATE \ ANP ◉

| Item                                                 | ANP 32-04-00 GRANULAR                      |
|------------------------------------------------------|--------------------------------------------|
| Purity                                               | 99.0% Min                                  |
| Total Nitrogen                                       | 32.0% Min                                  |
| Ammonical Nitrogen                                   | 17.5% Max                                  |
| Nitrate Nitrogen                                     | 14.5% Min                                  |
| Available Phosphate (as $\text{P}_2\text{O}_5$ )     | 4.0% Min                                   |
| Water Soluble Phosphate (as $\text{P}_2\text{O}_5$ ) | 3.0% Max                                   |
| Moisture                                             | 1.0% Min                                   |
| Water Insoluble Matter                               | 0.2% Max                                   |
| Total Chlorides (as Cl)                              | 0.1 % Max                                  |
| PH Value                                             | 4.0-6.0                                    |
| Appearance                                           | White Granular                             |
| Particle Size                                        | 1.0-4.75mm: 90%min                         |
| Packing                                              | 25/50KG PP plastic woven with PE inner bag |

## ◉ MAGNESIUM SULPHATE HEPTAHYDRATE ◉

Magnesium Sulphate Heptahydrate ( $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ ) as the heptahydrate sulfate mineral epsomite of Magnesium Sulphate, is commonly called Epsom salt. In gardening and other agriculture, magnesium sulphate is used for correcting a magnesium or sulfur deficiency in soil; magnesium is an essential element in the chlorophyll molecule, and sulfur is another important micronutrient. It is the most commonly applied to potted plants, or to magnesium-hungry crops, such as potatoes, roses, tomatoes, lemon trees, carrots, and peppers. The advantage of magnesium sulphate over other magnesium soil amendments (such as dolomitic lime) is its high solubility, which also allows the option of foliar feeding. Solutions of magnesium sulphate are also nearly neutral, as compared to alkaline salts of magnesium, as found in limestone; therefore, the use of magnesium sulphate as a magnesium source for soil does not significantly change the soil pH value. Magnesium sulphate heptahydrate is also used for maintaining the magnesium concentration in marine aquaria which contain large amounts of stony corals, as it is slowly depleted in their calcification process. In a magnesium-deficient marine aquarium, calcium and alkalinity concentrations are very difficult to control because not enough magnesium is present to stabilize these ions in the saltwater and prevent their spontaneous precipitation into calcium carbonate.

|                     |                                                                                                                                                                                                                                                    |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAS NO.             | 10034-99-8                                                                                                                                                                                                                                         |
| EINECS NO.          | 231-298-2                                                                                                                                                                                                                                          |
| HS CODE             | 2833 2100                                                                                                                                                                                                                                          |
| CHEMICAL FORMULA    | $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$                                                                                                                                                                                                          |
| MOLAR MASS          | 246.47 g/mol                                                                                                                                                                                                                                       |
| ODOR                | Odorless                                                                                                                                                                                                                                           |
| DENSITY             | 1.68 g/cm <sup>3</sup>                                                                                                                                                                                                                             |
| MELTING POINT       | Decomposes at 150°C (Anhydrous Decomposes at 1124°C)                                                                                                                                                                                               |
| SOLUBILITY IN WATER | 71 g/100 ml (20 °C)                                                                                                                                                                                                                                |
| CHARACTERISTIC      | Soluble in their own crystallization water at 67.5°C, air-slake easily in the dry air, lose 4 crystal water when heated to 70~80°C, lose 6 crystal water at 150°C, lose all of crystal water at 200°C                                              |
| STORAGE             | Stored in a cool, well-ventilated area. Far away from the fire or heat source. Prevent direct sunlight. Packing sealed. Should be stored away from oxidant, avoid mix storage. Storage areas shall be with the right material for leakage content. |

## ◉ SPECIFICATION OF MAGNESIUM SULPHATE HEPTAHYDRATE ◉

| Item                    | INDUSTRY GRADE                                 | AGRICULTURE GRADE |
|-------------------------|------------------------------------------------|-------------------|
| Purity                  | 99.5% min                                      | 99.0% min         |
| Magnesium (as MgO)      | 16.24% min                                     | 16.0% min         |
| Sulphur (as S)          | 12.5% min                                      | 12.0% min         |
| Chloride (as Cl)        | 0.02% max                                      | 0.2% max          |
| Iron (as Fe)            | 0.003% max                                     | 0.005% max        |
| Moisture (105°C)        | 1.5% max                                       | 1.5% max          |
| Water Insoluble Matters | 0.05% max                                      | 0.1% max          |
| Arsenic (as As)         | 0.0002% max                                    | 0.0002% max       |
| Heavy Metal (as Pb)     | 0.001% max                                     | 0.001% max        |
| PH Value                | 5.0-8.0                                        | 5.0-9.2           |
| Appearance              | White Crystalline Solid Powder                 |                   |
| Particle Size           | 0.1-1mm                                        |                   |
| Package                 | 25/50KG PP plastic woven with PE tie inner bag |                   |

## ◉ ORGANIC-INORGANIC FERTILIZER ◉

Organic-inorganic fertilizer is made by organic matters and inorganic nutrients. Organic matters are after processed peat, animal wastes, plant wastes from agriculture, and treated sewage sludge (biosolids), inorganic nutrients provide the nutrient needs for crop growing.

Organic-inorganic fertilizer is high and long-time efficiency fertilizer especially for balance fertilization, is usually used for green food production and ecological agriculture.

Organic-inorganic fertilizer contains a lot of beneficial microbes and humic acid, which can improve the soil quality by aeration and absorbing water and reducing the heavy metal content of soil that crops can absorbed.



|                  |                                               |              |
|------------------|-----------------------------------------------|--------------|
| CAS NO.          | 66455-26-3                                    |              |
| CHEMICAL FORMULA | $\text{N-P}_2\text{O}_5\text{-K}_2\text{O}$   |              |
| HS CODE          | NPK: Gross-weight less than 10kgs Per package | 3105 1000.90 |
|                  | NPK: Gross-weight more than 10kgs Per package | 3105 2000    |
|                  | NP Fertilizer                                 | 3105 5900    |
|                  | PK Fertilizer                                 | 3105 6000    |
|                  | NK Fertilizer                                 | 3105 9000    |

### Organic-inorganic Granular Fertilizer Typical Formulations:

NPK 08-08-08+20%OM NPK 05-05-05+20%OM NPK 15-00-00+30%OM NPK 10-00-15+20%OM  
NPK 10-00-08+10%OM NPK 12-01-04+20%OM NPK 16-00-02+20%OM etc.

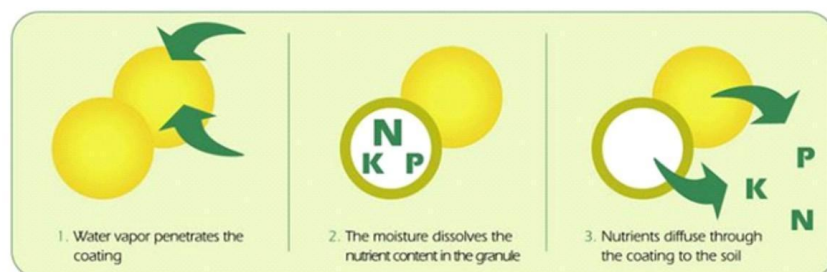


## ◉ CONTROL RELEASED FERTILIZER ◉

Different stages of plants growth needs uptake different nutrients. Their utility stems from the fact that fertilizers are subjected to antagonistic processes. In addition to providing the nutrition to plants, excess fertilizers can be poisonous to the same plant. Compete with the uptake by plants is the degradation or loss of the fertilizer. Microbes in soil may degrade many fertilizers by immobilization or oxidation to prevent uptake of plants. Furthermore, fertilizers are lost by evaporation or leaching.

Control-released fertilizers are traditional fertilizers encapsulated in a shell that degrades at a specified rate. Sulfur is a typical encapsulation material. Other coated products use thermoplastics (and sometimes ethylene-vinyl acetate and surfactants, etc.) to produce diffusion-controlled release of nitrogen or other element of fertilizers.

Controlled-release fertilizers are made of soluble fertilizer granules, encapsulated in a thin polymeric coating. This coating acts as a semi-permeable barrier that allows measured diffusion of nutrients when the fertilizer granules are applied to the soil.



Following application, Controlled-release fertilizer granules start absorbing moisture that dissolves the nutrients inside the granules. The dissolved nutrients then diffuse, slowly and continuously, into the root zone.

The rate of diffusion – the actual release rate - depends upon and is dictated solely by the soil temperature. The release rate increases as temperature rises, just as happens with plant uptake rates.

Other factors, such as soil type, humidity, pH, and microbial activity do not affect the release rate.



### THE SPECIAL BENEFITS OF GROWING PLANT WITH CONTROLLED-RELEASE FERTILIZERS

**Continuous nutrition** – fertilizers granules release nutrients slowly and constantly over several months.

**Labor saving** – only single application per season is required to provide the plants with the nutrition required for healthy growth. As availability of manpower in plantation areas may be limited, saving on application labor is a significant advantage.

**Reduced leaching of nutrients** – nutrients are protected from immediate dissolution, so even frequent rainfall will not leach the fertilizer from the root zone. As a result, nutrients are consumed more efficiently, and environmental pollution is avoided.



Fengfa Fertilizer