COMPATIBILITY OF VARIOUS SOLID INORGANIC FERTILIZERS

fertilizers europe

YARA Knowledge grows

	Ammonium Nitrate	Calcium Ammonium Nitrate	Calcium nitrate (fertilizer grade)	Ammonium sulphate nitrate	Potassium Nitrate / Sodium nitrate	Ammonium sulphate	Urea	Rock Phosphate	Partially acidulated rock phosphate	Single/Triple super phosphate	Monoammonium phosphate	Diammonium phosphate	Mono potassium phosphate	Potassium chloride	Potassium sulphate/ magnesium sulphate (kieserite)	NPK, NP, NK (AN based)	NPK, NP, NK (Urea based)	Limestone/dolomite/ calcium sulphate/Calcium carbonate	Sulphur (elemental)
Ammonium Nitrate			1	2		3	NC1		4	4				5		5	NC1		NC2
Calcium Ammonium Nitrate			6	2		2	NC1			7				5		5	NC1		NC2
Calcium nitrate (fertilizer grade)	1	6		8	8	8	8			8	8	8	8	8	9	8	8		8
Ammonium sulphate nitrate	2	2	8		2		NC1	10	4	7				5		5	NC1		NC2
Potassium Nitrate / Sodium nitrate			8	2		11										12	13		NC2
Ammonium sulphate	3	2	8		11											5			
Urea	NC1	NC1	8	NC1					14	15				16		NC1			
Rock Phosphate				10															
Partially acidulated rock phosphate	4			4			14					17							
Single/Triple super phosphate	4	7	8	7			15					17				4	14	17	
Monoammonium phosphate			8																
Diammonium phosphate			8						17	17									
Mono potassium phosphate			8																
Potassium chloride	5	5	8	5			16									5			
Potassium sulphate/magnesium sulphate (kieserite)			9																
NPK, NP, NK (AN based)	5	5	8	5	12	5	NC1			4				5			NC1		NC2
NPK, NP, NK (Urea based)	NC1	NC1	8	NC1	13					14						NC1			
Limestone/dolomite/calcium sulphate/Calcium carbonate										17									
Sulphur (elemental)	NC2	NC2	8	NC2	NC2											NC2			

	Compatible
	Limited compatibility linked to quality issues
	Limited compatibility related to safety or regulatory issues
NC	Not Compatible

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FOOTNOTES FOR THE NUMBERS IN THE BOXES IN THE COMPATIBILITY TABLE

Limited Compatibility

1. Due to the hygroscopic behaviour of both products, the type of stabilisation of the ammonium nitrate grade could influence storage properties.
2. Consider the safety implications regarding detonability of the blend (AN/AS mixtures) and legislative implications.
3. Consider the safety implications regarding detonability of the blend (AN/AS mixtures), impact of free acid and organic impurities, if present, and legislative implications.
4. If free acid is present it could cause very slow decomposition of AN, affecting, for example, packaging.
5. Consider the possibility of self-sustaining decomposition and the overall level of oil coating.
6. Due to the hygroscopic behaviour of both products, the type of stabilisation of the ammonium nitrate based fertilizer could influence the storage properties.
7. Consider the moisture content of the SSP/TSP.
8. Consider the relative humidity during blending.
9. Risk of formation of gypsum.
10. No experience but this can be expected to be compatible. Confirm by test and/or analysis.
11. Consider impurities in AS and the drop in the critical relative humidity of the blend.
12. Consider the likely impact of additional nitrate.
13. Consider the possibility of ammonium phosphate/potassium nitrate reaction with urea and relative humidity during blending to avoid caking.
14. If free acid present, there is a possibility of hydrolysis of urea giving ammonia and carbon dioxide.
15. Formation of very sticky urea phosphate.
16. Potential caking problem due to moisture.
17. If free acid is present, consider the risk of a reaction e.g. neutralisation with ammonia and acid attack with carbonates.

Not Compatible

NC1. Mixture will quickly become wet and absorb moisture resulting in formation of liquid or slurry. There could also be safety implications.

NC2. Sulphur is combustible and can react with nitrates e.g. AN, KNO_3 and $NaNO_3$.

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