

MINERAL FERTILISER CARBON FOOTPRINT REFERENCE VALUES: 2011, Fertilizers Europe, validated by European Commission methodology.

		GHG emissions (GWP 100 yrs: IPCC, 2007)									Energy consumption*	
Fertiliser product		Nutrient content	Fertiliser production	Fertiliser use (soil effects)					Fertiliser production + use		Fertiliser production	
			At plant gate	CO ₂ from urea hydrolysis	Direct N ₂ O from use	Indirect N ₂ O via NH ₃	Indirect N ₂ O via N ₂ O	CO ₂ from liming and CAN	Total	Total	On-site	
			kg CO ₂ -eq/kg product							kg CO ₂ -eq/kg product	kg CO ₂ -eq/kg nutrient	kJ/kg product
Ammonium nitrate	AN	33.5%N	1.18	0.00	1.26	0.01	0.35	0.27	3.06	9.14	14.02	
Calcium ammonium nitrate	CAN	27%N	1.00	0.00	0.89	0.01	0.28	0.20	2.40	8.88	11.78	
Ammonium sulphate	ANS	26%N, 14%S	0.83	0.00	0.10	0.02	0.27	0.40	2.62	10.09	10.61	
Calcium nitrate	CN	15.5%N	0.68	0.00	0.65	0.00	0.16	0.00	1.50	9.67	7.23	
Ammonium sulphate	AS	21%N, 24%S	0.58	0.00	0.98	0.02	0.22	0.50	2.30	10.95	8.07	
Ammonium phosphates	DAP	18%N, 46%P ₂ O ₅	0.73	0.00	0.76	0.01	0.19	0.34	2.03	11.27	6.76	
Urea	Urea	46%N	0.91	0.73	2.37	0.28	0.48	0.36	5.15	11.19	23.45	
Urea ammonium nitrate	UAN	30%N	0.82	0.25	1.40	0.10	0.32	0.24	3.13	10.43	13.84	
NPK 15-15-15	NPK	15%N, 15% P ₂ O ₅ , 15% K ₂ O	0.76	0.00	0.56	0.01	0.16	0.12	1.61	10.71	7.59	
Triple superphosphate	TSP	48% P ₂ O ₅	0.26	0.00	0.00	0.00	0.00	0.01	0.27	0.56	0.18	
Muriate of potash	MOP	60% K ₂ O	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.43	3.00	

FERTILISER PRODUCTION

GHG emissions and energy consumption representing European production technology in 2011, as provided by Fertilizers Europe in 2014 (calculated with FertEU Carbon Footprint calculator V1.0).

Key assumptions

- Emission and energy figures for fertiliser production are simple averages, i.e. not weighted according to production volumes per site
- Feedstock for ammonia production is natural gas
- Emissions from supply of energy (feedstock and fuel) are included (EU average European Ecoinvent 2.0, not weighted according to production volumes per site)
- Emissions from typical transport of raw material is included (for details see FertEU Carbon Footprint calculator V 1.0)
- Steam export from ammonia, nitric acid and sulphuric acid units is fully utilized in the site steam network

GHGs are converted into CO₂ equivalents (IPCC 2007, i.e. 1 kg N₂O = 298 kg CO₂-eq).

TRANSPORT AND HANDLING

Only included for raw materials, not for final products, which are all assumed to be produced in Europe (usually not very relevant for nitrogen fertilizers produced and used in Europe; could be significant for import/export).

FERTILISER USE (SOIL EFFECTS)

CO₂ from urea hydrolysis

Only relevant for urea and urea-containing fertilizers. Urea is hydrolysed shortly after application in the field. This process releases CO₂ (the amount is equivalent to the amount fixed during urea production. 733 kg CO₂/t urea

N₂O from fertilised soils

N₂O emissions due to microbial conversion of the fertilizer-N in the soil (nitrification and denitrification, so called "direct N₂O emissions"). Emission rates are based on fertiliser-specific emission factors developed by Bouwman et al. (2002). N₂O is converted into CO₂ equivalents (N₂O = 298 x CO₂)