Chemical Plants SIARKOPOL Tarnobrzeg Ltd.



Packaged Sulphur

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Elementary sulphur (S) is a non-metallic material which, at ambient temperature, is a solid substance. Sulphur melts at more than 114,5 °C and boils at 444,6 °C. Sulphur is used as a raw material in the organic and inorganic chemical industry, e.g. in the production of sulphuric acid, mineral fertilizers, plant protection products, explosives, rubber vulcanization, for disinfection of tools and premises used for agricultural production.

CHEMICAL PLANTS ",SIARKOPOL" TARNOBRZEG Ltd. have several products based on elementary sulphur in their trade offer, for direct use in industry or agriculture. It is also possible to use the offered elementary sulphur as a raw material for industrial production, under special formal-legal and quality requirements, but the confirmation of meeting these requirements remains with the sulphur users. The base material is high-purity liquid sulphur (over 99.95% sulphur).

Products for industrial use

- Granulated Sulphur
- Standard, Powder Sulphur
- Oiled Sulphur

These products are mainly used in the chemical industry (e.g. for the production of sulphuric acid, carbon disulphide, thiosulphates and sulphates); in the synthetic fibres industry, for the manufacture of dyes, plant protection products, paper, rubber, pulp, matches, fertilizers, pharmaceuticals, food. The indicated uses of the product are only information and do not replace the authorisations or approvals required by separate regulations.

Products for agricultural use

Sulphur is one of 20 elements necessary for the proper growth of plants, including crops, as it contributes to the formation of a number of basic (metabolic) processes in the plant, e.g. reduction of nitrates, reduction of atmospheric nitrogen, protein synthesis, uptake and reduction of sulphates.

CHEMICAL PLANTS "SIARKOPOL" TARNOBRZEG Ltd. offers a few above mentioned fertilizers, based on elementary sulphur, marketed on the basis of the Minister of Agriculture and Rural Development permits:

- Granulated Sulphur with bentonite (Wigor S, Wigor S Pro)
- Granulated Sulphur with bentonite and Boron(Wigor S z borem)
- Sulphurised suspension fertiliser (Pro Siarka S 800 S.C.)

The rules of application of the above mentioned fertilizers are specified in the Application Manual prepared by specialized agricultural institutes and approved by the Minister of Agriculture and Rural Development.

Elementary sulphur contained in the above mentioned fertilizers is gradually transformed in the soil into a sulfate form, taken up by plants. The gradual release of sulphur allows to reduce the losses that occur during the direct application of sulphate sulphur, washed out from the soil and polluting groundwater or surface water.

The company also offers two assortments of sulphur dedicated to agrotechnical purposes. These are:

- Wetted sulphur, produced from ground sulphur, enriched with additives changing the surface properties of sulphur, used to enrich manure with sulphur,
- Ground sulphur for agri-technical purposes, manufactured from granulated sulphur, containing at least 99,60 % sulphur, with a grain size of less than 0,063 mm (sieving on a 0,063 mm square mesh side screen not more than 2,8 %)

Granulated Sulphur

Form: Yellow or grey-yellow granules.

Properties

- Soluble in carbon disulphide and toluene,
- Slightly soluble in ethyl alcohol, benzene and diethyl ether,
- Insoluble in water,

112,8 °C	melting temperature	
444,6 °C	boiling temperature	
1200-1350 kg/m³	bulk density	

Quality parameters

Sulphur content, not less than	99,95%
Ash content, not more than	0,04%
Acids, expressed as H_2SO_4 , not more than	0,007%
Bitumen	0,015%
H ₂ 0 content, not more than	0,2%
Grain class 0,5 - 3,2 mm, not less than	90%
0,5 mm grain size and grain class 3,2-10 mm, not more than	10%

Application

In the fertilizer industry, in the chemical industry, for the production of sulphuric acid, carbon disulphide, thiosulphates and sulphates; in the synthetic fibre industry, for the manufacture of dyes, plant protection products, paper and others.

Transport

- land in bulk in special wagons; in paper or foil sacks (25 [kg] on pallets covered with shrink film) or big-bag type, rail or truck transport on pallets,
- sea in bulk

MSDS

Granulated sulphur is not subject to the ADR/RID regulations under special Provision No 242.

Powder Sulphur

Form: Light yellow powder.

- Properties
 - Soluble in carbon disulphide and toluene,
 - Slightly soluble in ethyl alcohol, benzene and diethyl ether,
 - Insoluble in water,

95,5 - 96,5%	solubility w CS ₂
112,8 °C	melting temperature
444,6 °C	boiling temperature
550-750 kg/m ³	bulk density

Quality parameters

Sulphur content, not less than	<mark>99,85%</mark>
Ash content, not more than	0,1%
Acids, expressed as H_2SO_4 , not more than	0,01%
Bitumen	0,02%
content H ₂ 0 not more than	0,2%

Grainning

sieving on a 0,063 mm square mesh side sieve, not more than	0,3
sieving in a sieve with a square mesh side of 0,15 mm, not more than	0,0

Application

In the rubber, cellulose, fertilizer, matchmaking, pharmaceutical and petroleum industries, for the production of plant protection products, artificial fibres, dyes.

Transport

- land in 25 [kg] paper sacks or big-bags by rail or truck transport on pallets,
- sea in containers, in 25 [kg] paper sacks on pallets covered with shrink film or in big-bags



Ground sulphur is not subject to ADR/RID regulations in accordance with classification certificate no. 031/IPOBC/2015 issued by the Institute of Organic Industry in Warsaw on 27.11.2015.

Oiled **Sulphur** 1%

Milled oiled sulphur containing 1% oil is not subject to ADR regulations in accordance with classification certificate No. 032/IPO-BC/2019 issued by the Institute of Organic Industry in Warsaw on 14.06.2019.

Form: Light yellow powder.

Properties

90 - 100 [°C]	melting temperature
290 [°C]	boiling temperature
600 - 800 [kg/m3]	bulk density

Quality parameters

Sulphur content, not less than	98%
Mineral oil content	1,0 ± 0,3%
Ash content, not more than	0,1%
Acids content, expressed as H_2SO_4 , not more than	0,01%
volatiles content, not more than	0,2%

Graining

sieving on a 0,063 mm square mesh side sieve, not more than	0,6
sieving on a 0,125 mm square mesh side sieve, not more than	0,2
sieving in a sieve with a square mesh side of 0,15 mm, not more than	0,0

Application

In the chemical industry, e.g. for the production and processing of rubber

Transport

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- land in big-bag packs on pallets or in three-layer paper sacks of 25 [kg] each on pallets covered with heat-shrink film/stretched, rail or truck transport,
- sea in containers, in three-layer paper sacks 25 [kg] on pallets covered with shrink film or in big-bags

MSDS



Wigor S

For the fertilization of sulphophilic plants



Purpose

The WIGOR S fertilizer is used to fertilize sulphurphilic crops, such as: rapeseed, peas, legumes, brassicas, sugar beet and beetroot, and cereals: wheat, barley and corn on soils deficient in sulphur.

Properties



Wigor S is a granular fertilizer containing 90% of sulphur. Due to its swelling properties in contact with water, the bentonite contained in fertilizer [pH> 7] causes fragmentation of sulphur. The sulphur molecules in the soil are oxidized by microorganisms to the sulphate form which is absorbable by plants. The effect of sulphate increase in the soil occurs after seven days from the application of fertilizer and the further systematic activation of sulphur provides an adequate plant supply of this element during the whole vegetation period.

MSDS

Functions of sulphur in the development of plants:

- enables the use of nitrogen
- it is essential in the synthesis of proteins,
- helps in reducing the proportion of non-protein nitrogen forms in plant (i.a. nitrates),
- enhances the taste and smell of plants (onion, garlic),
- increases the resistance of crops to diseases and pests as well as frost and drought.

Method and time of fertilizer application

For winter crops on arable land, the fertilizer should be used in plowing and sowing, and in the case of spring plants, for winter or spring plowing.

In other cases it is advisable to mix the fertilizer with soil to a depth of 15 cm. In legume crops, the fertilizer should be applied in accordance with the principles of soil fertilization in spring before or at the beginning of vegetation. Fertilizer should be spread evenly over the entire surface of the field in such a way as to prevent fertilization of fields and crops not intended for this purpose. Do not use higher doses than recommended.

Fertilizer dosage amounts

Depending on the crop and sulphur availability in the soil, the fertilizer is used in doses of 10 to 45 kg S/ ha, which makes 11-50 kg of fertilizer per hectare. The fertilizer can be used alone or in a mixture with other granulated fertilizers.

Cultivated plants	Doses (kg/ha)
cruciferous plants (cabbages)	10 - 40
winter rapeseed	20 - 40
corn	15 - 20
wheat	15 - 20
radish	35 - 40
barley	10 - 15
allium	10 - 15
sugar beet	30 - 35
beetroot	10 - 30
carrot	10 - 15
реа	15 - 20
tomatoes	10 - 30
alfalfa	15 - 20
bean	5 - 10

Pro-Siarka S 800 SC



Purpose

PRO-SIARKA S 800 SC fertilizer is made of finely fragmented (micronized) elemental sulphur, which enables its effective utilization (even above 75%) by the crops, especially sulfophilic plants, such as rapeseed and sugar beets. Beneficial yield-enhancing effects are also obtained after the application of the fertilizer on cereals and corn. The fertilizer can also be used on permanent grasslands as well as orchards and all vegetable crops.

Properties

The introduction of **PRO-SIARKA 800 SC** fertilizer into the soil (the sulphur is absorbed primarily from the soil solution) ensures an adequate plant supply of this element at all stages of development. The plants absorb sulphur gradually until the end of growing season, also in the maturation phase (rapeseed). The fertilizer is applied in the form of medium or fine spraying with the use of sprayers used in crop protection. The fertilizer can be used in physical mixtures with other liquid fertilizers, including the RSM fertilizer.

The positive yield-enhancing effects of the fertilizer sulphur are manifested by:

1. Direct increase in yields – as a result of the increased efficiency of the fertilized and soil nitrogen.

2. Increase of yield quality:

- Increase in the plants protein content; the sulphuric amino acids: cysteine and methionine, are required for protein synthesis,
- increase in the fat content in the oil plant seeds which exhibit several times greater demand for sulphur than cereals,
- increase in the gluten content improved baking quality of flour,
- increase in starch content of grain crops sulphur extends the grain filling phase,
- reduction in the total nitrogen content in the grain of malting barley,
- increase in the starch content in potato tubers and sucrose content in the roots of sugar beets,
- reduction in nitrate content in vegetables,

3. Carbohydrate management improvement during the late fall and early spring, which indirectly causes an increase in tolerance of plants to abiotic stresses (high and low temperatures, drought).

4. Increase in the synthesis of mechanical tissues, sulphur stimulates the synthesis of lignins (methionine) and as a consequence – an increase in the resistance to abiotic stresses – lodging and biotic stresses – infection by diseases and pests.

5. Reduction of diseases controlled at least partially by sulphur:

- Potatoes Potato scab and potato rhizoctionia,
- **Rapeseed** Cylindrosporium concentricum of rapeseed leaves,
- Cereals powdery mildew,

6. Improvement in taste and aromatic qualities of the allium vegetables: onion, garlic; Sulphur increases the content of essential oils (Cycloalliin - onion and horseradish, Allicin - garlic).

Mineral suspension fertilizer. Contains micronized sulphur - 800 g S in 1litre of fertilizer.

Dosages and timing of fertilizer application

Cultivated plants	Doses (l/ha)	Recommended Amount of water (I/ha)	Fertilizer application date or plant development stage	Plant deve- lopment Stage according to the BBA scale
	5	300 - 500	In the fall after crop emergence	10 - 29
Winter rapeseed	8	300 - 500	early spring	30 - 50
	6	300 - 500	before flowering	50 - 57
barley, wheat, rye	5	300 - 500	after the emergence until the beginning of tillering	10 - 19*
Malting barley, triticale	5	300 - 500	end of tillering, stalk shooting	23 - 30*
oat	5	300 - 500	until the end of heading phase	32 - 59*
corn for grain and silage	10	700 - 1 000	fully developed 2-6 leaves	19-24
potato	5	300 - 500	several times, starting from the leaf development phase to the end of flowering	21 - 70
sugar beet	5	300 - 500	in the leaf development phase	20 - 26
Sugar Deet	5	300 - 500	3-4 weeks after row closure	31 - 33
field pea, pea	5	300 - 500	in the period of 1 to 4 fully developed leaves	11 - 19
lupine, sunflower	5	300 - 500	until the flowering phase	30 - 59
grasslands	20	3 000 - 4 000	before the beginning of growing season)) - 김
hops	5	800 - 1000	after starting hops on strings	-
	5	1500 - 2000	after hops reach the height of the trellis	-
	5	2 500 - 3 000	during the flowering phase	-

* *according to Zadox scale



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