

Grain harvester **PALESSE GS 4118K**

Pure wheat





Description of innovative design features:

Self-propelled combine harvester PALESSE GS 4118K is the first harvester in the world which works on compressed natural gas.

The scientific and technical novelty is based on the use of a number of constructive solutions that have no analogues in the world, including innovative solutions for the arrangement and placement of the gas engine equipment on the frame of a threshing machine that ensures its operation without refueling during the working day.

This is the only agricultural machine in the world that provides emissions toxicity at the level of the environmental class Stage V without using Adblue or urea and particulate filter. In addition, thanks to the original method of controlling the power of the gas engine in comparison with diesel engines, the dynamic load of the transmission of the machine is significantly reduced. The arrangement and design of the components of the gas-cylinder equipment correspond with all the safety requirements for gas-engine machines in terms of maintenance and performance of technological operations.

8 cylinders with a hydraulic capacity of 1 816 liters contain about 450 m³ of compressed natural gas. These cylinders provide a possibility to work in the normative performance mode continuously for 8-10 hours without stopping to refuel.

Refueling of cylinders with natural gas can be realized by mobile gas station right in the field.

Importance of innovation for practice:

Growing relevance of the extension of the use of natural gas as engine fuel is caused by the need to increase the energy efficiency of agricultural machinery, rise in the prices of traditional types of oil fuels, tightening of environmental requirements for the content of harmful substances in the exhaust gases of machinery, etc.

The use of natural gas on grain combine harvesters as engine fuel provides an opportunity:

- to reduce the cost of grain and leguminous crops harvesting by means of a lower price of natural gas;
- to reduce emissions of toxic substances into the environment and at the same time ensure environmental requirements of Stage V without increasing the cost of engines;
- to increase the service life of the power unit and increase intervals between the engine maintenance service.

Advantages for the economy of the enterprise and the balance of labor resources:

Replacing of traditional fuels with natural gas provides an opportunity to reduce the costs of agricultural enterprises for combustive and lubricating materials. Tests of the combine demonstrated the cost saving of 45-50% in comparison with the diesel analog.

Conservation of natural resources and increase of soil fertility:

Replacement of diesel fuel with natural gas provides an opportunity to reduce the level of polluting emissions and thereof to reduce the progress rate of soil degradation.



Upgrading energy efficiency and improving the environmental situation:

During the combustion of natural gas, solid particles and ash which cause an increased wear of the cylinders and pistons of the engine do not arise. This fact significantly increases the operating life of the engine.

In comparison to diesel fuel, the use of gas reduces emissions of toxic substances into the environment (carbon monoxide – by 2,5 times, nitric oxide – by 2 times, hydrocarbons – by 3 times, smoke – by 9 times), guarantees the suitability to environmental requirements of Stage V without increasing the cost of engines.

Influence on safety and facilitation of work:

Compressed natural gas in case of a leak disappears quickly and completely, without causing any fire hazardous situation, like diesel fuel or gasoline. It also eliminates the harmful effect on the skin of the machine operator.

Technical characteristics of the combine harvester PALESSE GS 4118K:

Engine		
Engine model		CUMMINS IS12G
Nominal engine power	kW / h.p.	257 / 350
Fuel cylinder capacity	l	1 816
Type of fuel		methane
Headers		
Cutting width of header	m	6,0 / 7,0 / 9,2
Pick-up width	m	3,4 / 4,4
Threshing system		
Threshing system type		drum-type
Threshing drum width	mm	1 500
Threshing drum diameter	mm	800
Shaft speed of threshing drum	rpm	440...875
Concave area	m ²	2,39
Separation and cleaning system		
Straw walker	pcs	5
Length of straw walker key	mm	4 100
Separation area	m ²	6,15
Total sieve area	m ²	5,0
Grain tank		
Grain tank volume	m ³	9
Height of unloading auger	mm	4 000
Running gear		
Operating speed	km/h	8
Road speed	km/h	20
Overall dimensions and weight		
Length / Width / Height in operating position	mm	11 200 / 7 600 / 4 650
Length / Width / Height in transport position	mm	18 100 / 3 900 / 4 000
Weight of the thresher	kg	16 600

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