50X1-HUM

CLASSIFICATION SECURITY INFORMATION CONFIDENTIAL ~~CONFIDENTIAL~~

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
CD NO.

COUNTRY	USSR	DATE OF INFORMATION	1950 - 1951
SUBJECT	Economic; Technological - Automobile industry, gas motors	DATE DIST.	25 Oct 1951
HOW PUBLISHED	Monthly periodical		
WHERE PUBLISHED	Moscow	NO. OF PAGES	3
DATE PUBLISHED	Feb 1951	SUPPLEMENT TO REPORT NO.	
LANGUAGE	Russian		

THIS IS UNEVALUATED INFORMATION

SOURCE Avtomobil', No 2, 1951.

GAZ-51 GAS-CYLINDER TRUCK WITH GAS MOTOR

Engr V. Koshkin

The inadequate development of a network of gas filling stations has, until now, favored the use of general-purpose trucks which can operate on both liquid and gas fuel, like the ZIS-156 and the GAZ-51B; now, however, with the growth of such a network, the gas-cylinder truck, which has a motor specially designed to operate on gas only, must be broadly expanded.

The gas-cylinder trucks with the gas motors have high technical indexes. They make the most complete use of the effectual physico-chemical properties of the gaseous fuel. The power per liter displacement of the gas motor is significantly higher than the power of the general-purpose truck operating on both gas and liquid fuel. The specific fuel consumption of the gas motor is lower, thereby extending the distance that can be traveled with it before refueling. In dynamic qualities and performance, the gas motors are almost identical with those operating on gasoline. Even though the automobile industry does not yet put out gas-cylinder motors, preliminary investigative work for making this type of truck is being conducted. A brief description of the GAZ-51 with the gas motor follows, as well as a statement of the results achieved in tests by NAMI (Scientific Research Automobile and Automobile Motor Institute).

Layout of the Gas Equipment

The GAZ-51 has only one gas cylinder, as opposed to the usual two, with fewer fittings and gas lines. No change in the position of the spare wheel is required. The basic gas equipment consists of a cylinder, a feeding fixture, a compressor regulator (reducer), a condenser, and a mixer.

The cylinder is welded from sheet steel 5 millimeters thick, with a yield strength of nearly 40 kilograms per square millimeter. The cylinder is designed for a working pressure of 16 kilograms per square centimeter. The ends of the cylinder are hemispherical. The shell is made from a whole sheet, with a longitudinal welded seam. The dimensions of the cylinder are as follows: diameter, 400 millimeters; length (without fittings), 945 millimeters; capacity, 95 liters. The fittings -- liquid and vapor valves, fuel indicator, level indicator, safety valve, and filling valve -- are located at the front end.

SECURITY INFORMATION ~~CONFIDENTIAL~~

CLASSIFICATION CONFIDENTIAL

STATE	X	NAVY	X	NSRB		DISTRIBUTION						
ARMY	X	AIR	X	FBI								

50X1-HUM

The two-stage reducer is almost completely standardized with the reducer for compressed gas used in the ZIS-156 and the GAZ-51B. The spring and the valve of the first stage are different; a flat rubber valve is used instead of a steel spherical type.

An economizer with a pneumatic drive is located in the reducer and a gas filter is installed in the intake connecting pipe.

The water vaporizer is a coil made of copper tubes 10 millimeters in diameter, and enclosed in a cylindrical steel casing. The vaporizer casing is welded in one piece. The vaporizer is connected with the cooling system of the motor by means of two rubber hoses.

The gas mixer consists of three basic parts: the air throttle housing with the air throttle, the housing with the diffuser and the intake gas pipe, and the mixing chamber housing (with the throttle and governor of the maximum number of revolutions), interchangeable with the housing of the K-49A carburetor.

The proportioning of the gas to be fed for a full or partial load of the motor is done with the aid of a slide valve located at the intake pipe of the reducer.

The gas for the idling motor is fed by a main hose connecting the reducer with the mixer. The idling is regulated by means of the set screw of the throttle. Exact regulation, that is, adjustment of the mixture at low speed and at idling of the motor, is effected by the regulating screw of the reducer.

Motor

The following changes have been made in the standard GAZ-51 motor to obtain the most power in operating with gas.

1. The intake pipe is separated from the exhaust pipe and placed on the cylinder head, thereby eliminating heating of the combustible gas-air mixture.

2. Instead of lower intake valves, upper valves with an increased diameter (42 millimeters) are used. They are placed in the cast-iron cylinder head. The compression ratio has been increased from 6.2 to 8.6.

3. A gas mixer with a diffuser, having a diameter of 28 millimeters, is used instead of the usual carburetor.

4. While the ignition system is the same as in the GAZ-51 gasoline motor, the standard spark plugs are replaced by spark plugs with a 14-millimeter thread.

5. A small starting carburetor was installed for starting the motor; however, at the time of the test, it was not used and the motor was started on compressed gas.

As a result of the design changes indicated, the maximum power of the motor operating on compressed gas rose to 76 horsepower (at 2,800 revolutions per minute), exceeding by 21 percent the maximum power of the general-purpose gas cylinder motor operating on gas. The increase of motor power significantly improved the dynamic qualities of the truck. The average working and maximum speed were raised, and the rate of acceleration was increased. The following table shows the average and maximum speed developed by a GAZ-51 on a one-kilometer stretch without a preliminary start, using different carburetors and fuels.

50X1-HUM

Fuel	Motor	Type Carburetor or Mixer	Load (tons)	Average Speed on 1-Km Stretch (km/hr)	Max Speed (km/hr)
Gasoline	Standard	Carburetor-mixer K-49 A	2.5	47.3	72.3
Compressed gas	Standard	Carburetor-mixer K-49 A	2.5	44.0	68.9
Compressed gas	Gas	Mixer	2.5	51.5	83.9

The employment of the special gas motor for gas-cylinder vehicles will be particularly expedient when compressed medium-fuel-value gases, like coke and natural gases, are used. The standard motor loses 15-20 percent of its rated power when operating on these gases.

The average consumption of compressed gas by the [illegible] with the gas motor is 17-20 kilograms for 100 kilometers on the highway and 20-23 kilograms for 100 kilometers in town. The truck can travel 235 kilometers before refueling.

Using the motor described above, A. Ambrosenkov took second place in the GAZ-51 class in a race organized by the Central Moscow Automobile Club on 3 December 1950.

- E N D -