

**METHODS OF DETERMINING THE CONTENT OF POLLUTANTS IN THE COMBUSTION PRODUCTS OF PLASMA WATER AND ORGANIC COMPOSITIONS OF THE REACTOR PORTABLE GAS ANALYZER «QUINTOX» KM9106**

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**Abstract**

In this work a scheme of plasma stand "Plasma module based on high-frequency generator VCHG8-60/13-01" with a gas analyzer «Quintox» KM9106 is considered. The measurements of harmful substances (CO, NO, NO<sub>2</sub>) in the exhaust gases of the plasma operating module are made.

Keywords: plasma stand, gas analyzer, plasma operating module, high-frequency generator.

**INTRODUCTION**

Gas analyzer is an instrument for measuring qualitative and quantitative composition of gas mixtures.

There are manual and automatic analyzers. Among the first are the most common absorption analyzers, in which the components of the gas mixture are successively absorbed by various reagents. Automatic analyzers continuously measure physical and chemical characteristics of the gas mixture and its individual components.

The main goal of the research is to provide a gas analyzer «Quintox» KM9106 and to analyze the composition of the gas mixture.

**EXPERIMENTAL**

The figure shows the scheme and the photo of a laboratory plasma stand "Plasma module based on high-frequency generator VCHG8-60/13-01", intended for studying plasma burning of different fuel compositions in terms of air plasma VCHF(high-frequency jet) discharge.

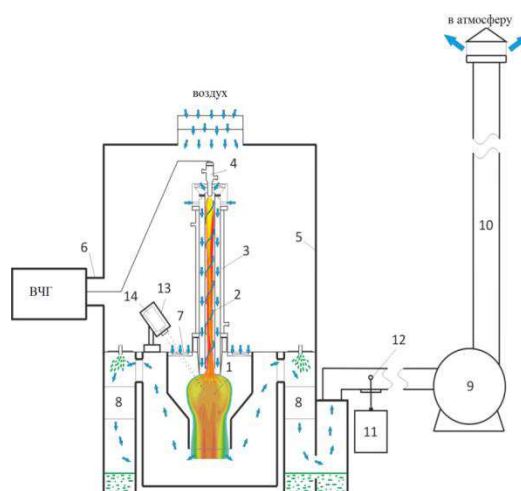


Fig.1 The scheme of a laboratory plasma stand "Plasma module based on high-frequency generator VCHG8-60/13-01."

1 is dispersant, 2 is VCHF-discharge, 3 is VCHF plasmatron, 4 is copper electrode, 5 is housing module, 6 is

coaxial output, 7 is impeller reactor, 8 is the node of "wet" cleaning exhaust gases, 9 is exhaust fan (PL 12-26, № 4), 10 is duct, 11 is analyzer «Quintox» CM 9106, 12 is sampler, 13 is protective cover pyrometer, 14 is pyrometer IPE 140/45, ICH - HF generator VCHG8-60/13-01



Fig.2 The photo of a laboratory plasma stand "Plasma module based on high-frequency generator VCHG8-60/13-01" with installed gas analyzer «Quintox» KM9106

Plasma stand includes a high frequency generator VCHG8-60/13-01 (vibrational power up to 60 kW , operating frequency  $(13,56 \pm 0,13)$  MHz) , from which the coaxial output 6 RF energy is supplied to the water-cooled copper electrode 4. High-frequency jet plasmatron 3 is designed to generate air streams with average mass plasma temperature up to 4000 K. Extractor fan 9 provides a constant flow of air through VCHF plasmatron 3 and impeller 7 into the reactor.

The analyzer 11 is to determine the content in the flue gases from the reactor pollutants (CO, NO, NO<sub>2</sub>, SO<sub>2</sub>, C<sub>x</sub>H<sub>y</sub>), and controlling the CO<sub>2</sub> content in the plasma of combustion products (not less than 10 %) required in the reactor to ensure sufficient penetration depth of the laser beam pyrometer (not more than 0.5 m).

Pyrometer 14 is designed for non-contact measurement of plasma burning temperature in a reactor of dispersed combustible compositions along CO<sub>2</sub> absorption line.

Table 1 shows typical results of measurements of harmful substances in the exhaust gases during operation of VCHF plasmatron (3) in different modes ( $I_a = 0 \dots 3.0$  A) , with a working unit of "wet" cleaning (WCU) and without WCU ( $Q_{VV} \approx 3000$  m<sup>3</sup> / h).

Table 1 The content of harmful substances in the exhaust gases

№р / р	Ia, A	NO, mg/m <sup>3</sup>	NO <sub>2</sub> , mg/m <sup>3</sup>	Note
1	0	0	0	without VCHFR and UMO
1	2,6	70	2	without UMO
2	2,6	72	4	with UMO
3	2,6	71	4	with UMO
4	2,6	62	4	without UMO
5	2,8	78	2	without UMO
6	2,8	87	4	with UMO
7	2,8	75	4	with UMO
8	2,8	86	4	without UMO
9	3,0	91	4	without UMO
11	3,0	96	4	with UMO
12	3,0	84	2	with UMO
13	3,0	90	6	without UMO
14	0	0	0	without VCHFR and UMO

## CONCLUSION

In the research work plasma stand "Plasma module based on the high-frequency generator VCHG8-60/13-01" with a gas analyzer «Quintox» KM9106 has been studied. The measurements of harmful substances (CO, NO, NO<sub>2</sub>) in the exhaust gases of the plasma operating module have been made.

## REFERENCES

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