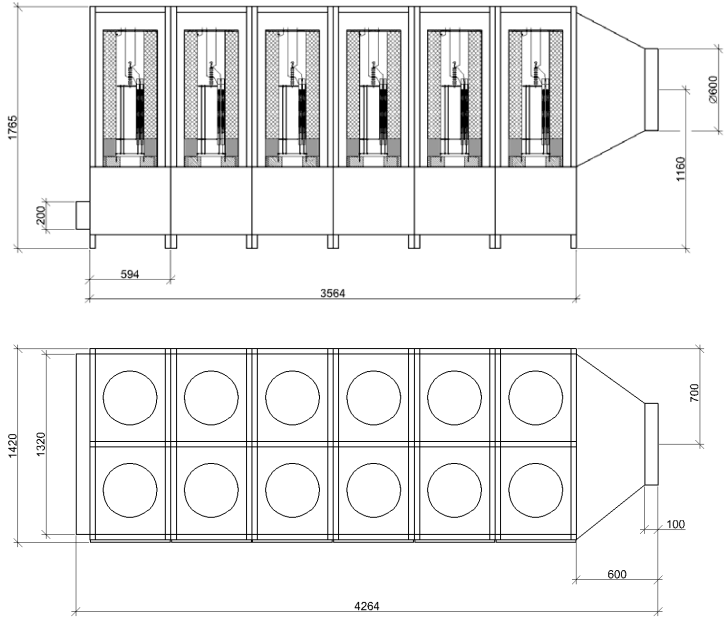
TECHNICAL DATA

Rated air capacity	from 5,000 to 6,000 m^3/h
Waste treatment efficiency	from 85 to 95 %
Gas temperature at plant input	from 0 to 120^0C
Target air relative humidity	up to 85%
Maximum plant aerodynamic drag	up to 1,200 Pa
Electric power consumption by the plant plasma catalytic reactor	7.5 kVA 380 V, 50 Hz; 15 kVA 380 V, 150 Hz.
Catalyst volume	from 600 to 850 l
Dust concentration at plant input	5 mg/m^3 max.
Concentration of contaminants	up to 3,000 mg/m^3
Plant dimensions (w/o power supply unit and control console) Length, L, mm Width, B, mm Height, H, mm Inlet diameter, mm Outlet diameter, mm	 4,264 720 1,765 200*620 400
Plant mass with power supply unit and control console	up to 800 kg

Plasma catalytic gas (air) treatment plant
PlazKat Aero 10/30/12 Model

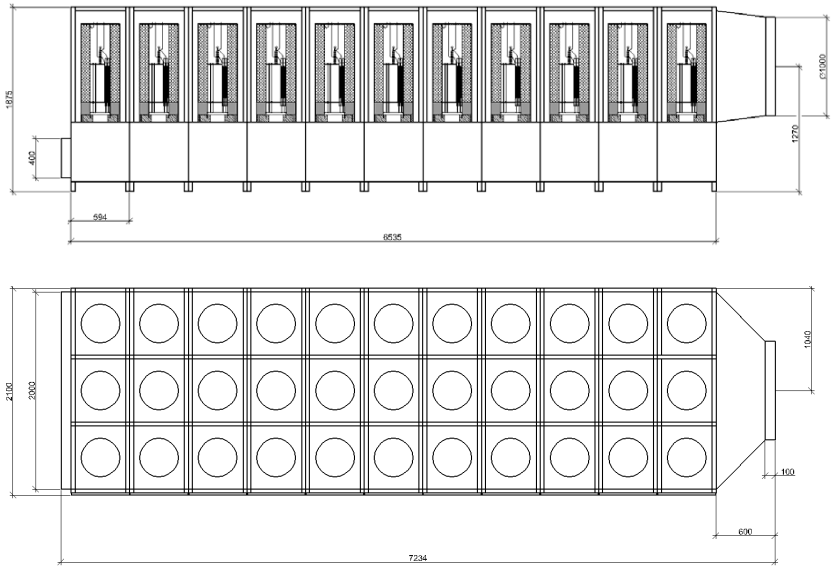


TECHNICAL DATA

Rated air capacity	from 10,000 to 12,000 m^3/hour
Waste treatment efficiency	at least 85-95%
Gas temperature at plant input	from 0 to 120^0C
Target air relative humidity	up to 85%
Maximum plant aerodynamic drag	up to 1,200 Pa
Electric power consumption by the plant plasma catalytic reactor	15 kVA 380 V, 50 Hz 30 kVA 380 V, 150 Hz
Catalyst volume	from 0.54 to 1.14 m^3
Dust concentration at plant input	5 mg/m^3 max.
Concentration of contaminants	up to 3,000 mg/m^3

Plant dimensions (w/o power supply unit and control console) Length, L, mm Width, B, mm Height, H, mm Inlet diameter, mm Outlet diameter, mm	 4,264 1,420 1,765 600 600
Plant mass including power supply unit and control console	up to 1,200 kg

Plasma catalytic gas (air) treatment plant
PlazKat Aero 30/60/33 Model



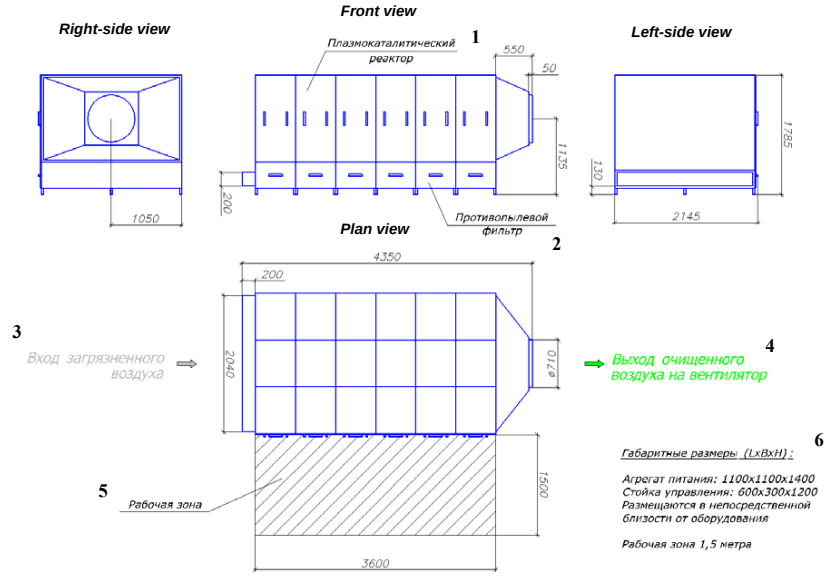
TECHNICAL DATA

Rated air capacity	from 30,000 to 35,000 m^3/hour
Waste treatment efficiency	at least 85-95%
Gas temperature at plant input	from 0 to 120^0C
Target air relative humidity	up to 85%
Maximum plant aerodynamic drag	up to 1,200 Pa
Electric power consumption by the plant plasma catalytic reactor	30 kVA 380 V, 50 Hz 60 kVA 380 V, 150 Hz
Catalyst volume	from 1.5 to 5 m^3
Dust concentration at plant input	5 mg/m^3 max
Concentration of contaminants	up to 3,000 mg/m^3
Plant dimensions (w/o power supply unit and control console) Length, L, mm Width, B, mm Height, H, mm Inlet diameter, mm Outlet diameter, mm	 7,234 2,100 1,875 400*2,000 1,000
Plant mass with power supply unit and control console	up to 6,500 kg

PLAZKAT AERO PLANT SERVICE AREA

To assemble, undertake individual and integrated equipment tests and maintenance a provision is made for the service area 1,500 mm wide in front of the face of the PlazKat Aero plants. Below is the layout diagram which shows the service area in front of PlazKat Aero plant of 15,000 m^3/hour capacity.

PlazKat Aero 15000/30000 plant dimensions and services areas



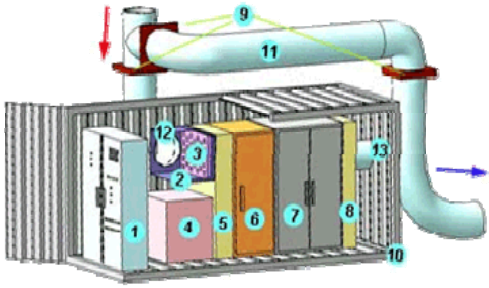
1 – plasma catalytic reactor;
2 – dust filter;
3 – contaminated air;
4 – clean air to fan;
5 – working area;

6 – Dimensions (L x W x H):
Power supply unit: 1,100 x 1,100 x 1,400
Control console: 600 x 300 x 1,200
Both are to be located next to equipment

Working area: 1.5 m

VERSIONS OF EQUIPMENT LAYOUT

A. INSTALLATION IN A STANDARD CONTAINER OR IN A DEDICATED GAS CLEANING ROOM



1. Automatic control console
2. Mixing chamber
3. Dust filter
4. transformer
5. Inlet airlock
6.+7. Plasma catalytic reactor
8. Outlet airlock
9. Automatically-operated locks
10. Standard container
11. Bypass gas flue
12. Inlet pipe
13. Outlet pipe

The plant is place in a standard metal container or room. The container (room) walls have entries for inlet (12) and outlet (13) gas flues. The container (room) encloses pre-filter (3), plasma catalytic reactor (6,7), power supply unit (4), and automatic control console (1).

Usually, 20- and 40-feet containers are used. Containers are furnished with lighting, heating and ventilation system which allows maintenance to be performed at any time of the year. Containerization of the gas treatment plant ensures good noise insulation, electrical, explosion and fire safety and protects gas cleaning equipment from precipitation and low temperature. Air capacity of containerized gas cleaning systems varies from 3,000 to 40,000 m^3/hour.

Advantages of such arrangement are as follows:

1. Smaller area occupied by the plant.
2. Smaller scope and shorter time of construction and installation work.
3. Electrical and fire safety issues are addressed.
4. Equipment tightness and, consequently, low noise level.
5. Long service life of cleaning equipment, high level of automation and stable air cleaning process.

B. ARRANGEMENT IN A PRODUCTION SHOP

The plant is place in a dedicated area for ventilation, air-conditioning and cleaning equipment such as ventilation chambers and process floors.

This arrangement does not require additional heating of the plant location. Equipment is installed next to exhaust ventilators. A provision is to be made for the equipment service area and a bypass (bypass gas flue) required for equipment scheduled maintenance.

C. INSTALLATION ON BUILDING ROOF

If there is no space in exhaust ventilation chambers in production shops, equipment may be immediately installed on roof of building. In this case equipment is to be preferably installed in a shelter made of light structures. Inlet and outlet gas flues are wrapped in insulant.

The equipment control console may be backed up inside the shop to make plant control easy.

COMPLETE SET OF PLAZKAT AERO EQUIPMENT

The standard complete set of PlazKat Aero plant equipment includes:

1. Plasma catalytic reactor.
2. Catalyst.
3. Plant power supply unit.
4. Plant control console.

Optionally, the delivery set may include the following items (at the discretion of a CUSTOMER).

1. Inlet and outlet gas flues.
2. Bypass (bypass gas flue).
3. Lock-up valves.
4. Inlet power supply cables.
5. Medium pressure exhaust fan.

IMPORTANT: On commissioning equipment a medium-pressure exhaust fan is to be used which creates depression of at least 1,500 Pa at plant's rated air capacity. If this requirement is not met, the manufacturer does not make a warranty in regard to equipment serviceability and reserves the right to terminate such warranty.

PRICING

Price of equipment is set by our specialists after review of the completed questionnaire. In a first approximation, price of equipment is directly proportional to amount of contaminants (g/s).

Lease of gas treatment plants and air cleaners

For the first time our company offers on the market the ecological engineering equipment of own make for leasing. Today industry people understand that production of industrial equipment and consumer goods implies enforcement of environmental and sanitary regulations. Often, it involves use of ecological engineering equipment for various purposes. In particular, it includes gas treatment plants and air cleaners manufactured by our Company. It is clear that our plants differ in price dictated by a number of factors which are easily found on our official site. Prices may vary within wide ranges. Production facilities that need ecological engineering machinery sometimes may not afford expensive cleaning equipment. The only satisfactory solution to both parties lies in leasing.

General terms and conditions of a lease agreement on cleaning equipment are as follows:

The price of an item of equipment is known at the moment the agreement is signed and remains unchanged for the whole term of the agreement. The term of an agreement varies from 1 to 3 years and sometimes may reach 5 years. Lessee's own funds must account for 30%. Lease rate (appreciation of an item under lease) is 10% and more. Equipment shall be purchaser's property as soon as the price of cleaning equipment is paid in full. Collaterals that may provide for guarantees in a contract include an item under lease, lessee's mortgaged property, financial surety, bills of exchange, and bank guarantees.

PLAZKAT AERO PLANT MAINTENANCE

Frequency	Operations	Remarks
Once every two weeks	Visual inspection of plant's modules, power supply unit, connections and attachment, and attachment of the device to structural frames.	Control is exercised by operational service of a production facility.
Once a month	Visual inspection of earthing devices for safety, operation of the power supply unit, dust filters and plants aerodynamic drag.	Control is exercised by operational service of a production facility.
Bi-annually	Inspection of catalyst, plasma modules, and power supply unit.	Control is exercised by a manufacturer.
Annually	Check of earthing devices for resistance. Check working characteristics of the device.	Control is exercised by a manufacturer.

Warranty in regard to PLAZKAT AERO plants is made for a period of 12 months after plant's commissioning. We suggest to customers that a maintenance contract be concluded for the warranty and post-warranty period to include the following operations:

1. Visual inspection of the plant.
2. Inspection of power and high-voltage cables, grounding, and transformer.
3. Test of switches, indicator lights and plant's protection.
4. Inspection of gas-discharge modules:
    4.1. for workability;
    4.2. dust;
    4.3. growth of decomposition products on contaminants;
    4.4. resistance measured by a megohm meter;
    4.5. working current in phases, and
    4.6. condition of insulators;

5. Check of catalyst for:
    5.1. dust;
    5.2. growth of resins and decomposition products;
    5.3. moisture on surface, and
    5.4. loss.
6. Plant functional tests:
    6.1. measurements of aerodynamic drag, and
    6.2. determination of gas treatment efficiency.

The average price of a maintenance contract varies from 100 to 250 thousand rubles per year according to sophistication of equipment purchased.

PLAZKAT AERO PLANT APPLICATIONS

The plants are widely used in the following industries (major):

1. Chemical

Plasma catalytic treatment is rather desirable in the following processes of chemical industry: basic organic synthesis, production of artificial fibers and manufacture of mineral fertilizers.

This technique is believed to be promising since it allows practically complete breakdown of organic contaminants in air released into atmosphere. Plasma catalytic air cleaners efficiently destroy harmful impurities with unpleasant smell including **amines, sulfides, mercaptans, unsaturated hydrocarbons etc.**

Usually, industrial ventilation systems do not contain special-purpose equipment for chemical and bactericidal indoor air treatment, and conventional increase of ventilation system capacity may not efficiently reduce concentration of contaminants in shop working areas. Plasma catalytic treatment systems built into existing ventilation and local mobile air cleaners on work sites make it possible to solve this problem.

2. Oil and gas

To reduce atmospheric emissions by gas processing and gas transport industries is an acute problem of today. Most widely used technique of tail gas treatment comprises complete burning though this method does not provide adequate treatment efficiency.

Gas compression stations that maintain pressure in gas lines use a part of natural gas as a heat transfer agent. Stations located along gas lines pose risk to environment and health of people, since gas turbine discharge **nitrogen and carbon oxides and formaldehyde** of which emissions are regulated.

To solve the problem of emissions only by burning in turbines is not possible because it may result in growth of CO and hydrocarbon emissions. To reduce emissions it is advisable to use plasma catalytic treatment of tail gases.

Air treatment problem is acute for facilities which use great amounts of oil refinery products.

3. Pharmaceutical

Requirements for clean ambient air in areas for production of drugs and medical equipment reflect a great variety of products. Products have various shapes and size, operations are different and time of stay in production area varies. For this reason standards that set out requirements for air purity in production areas tend to omit details. However, unlike other industries, here restrictions on biological air contamination are more stringent.

Use of plasma catalytic air treatment apparatuses in pharmaceuticals is particularly desirable since the technique allows treatment for biological contaminants in addition to harmful impurities.

Independent test have shown high-level decontamination of air treated in a plasma catalytic air cleaner. Therefore, the apparatuses may be rather useful in pharmaceutical processes which require air disinfection. What is most important is that plasma catalytic treatment apparatuses may be efficiently used in the processes where finishing sterilization is not allowed, and extraordinary safety precautions are to be taken to avoid product contamination with viable microorganisms.

Efficiency of plasma catalytic apparatuses in air treatment for biological contaminants is governed by ozone effect. Ozone kills microorganisms and destroys their protein structure. Air is treated with ozone in the plasma chemical reactor of air cleaners. Excessive ozone is completely neutralized in the second stage of the apparatus and is prevented from mixing with ambient air in rooms.

4. Production and processing of plastics and polymers

In production of polymers ambient air in the working area is contaminated with a lot of pollutants (contaminants) which comprise organic substances of various origins (**carboxylic acids, ketones, hydrocarbons C_1-C_{10} and other**).

Production of items from thermoplastics including polyethylene, polystyrene, and polypropylene is associated with atmospheric emissions of contaminants such as **styrene, acetic acid, carbon oxide**.

Production of thermosetting plastics where starting materials comprise phenolic plastics is associated with release of **phenol**. Sources of air contamination include heater and molding machines.

In production and laser cutting of plastics ambient air is contaminated with **methylmethacrylate, vinyl chloride etc**.

The mentioned substances contained in the working area ambient air produce harmful effect at least on personnel. In addition, release of organic substances into atmospheric air is regarded as environmental pollution and penalized in compliance with current regulations**.**

Use of plasma catalytic plants in the industry is economically justifiable since consumed resources include electric power only, and no need for changeable elements and catalyst regeneration.

5. Paint making

It is known that 100% of solvents contained in paints are released into atmospheric air when paint is, first, applied and then dried. In addition, when paint coating is applied in a paint spray booth about 30% of sprayed paint is released into ambient air.

Paint spray booths, usually, are equipped with hydro filters which, however, fail to catch **solvent vapors**. Content of solvents in circulating water rapidly reaches saturation and they may not be absorbed any more. Where once-through water supply system is used, solvents are released into atmosphere via sewerage.

Harmful substances (**xylene, benzene, acetone and other solvents**) evolved in paint spray booths and drying ovens mix with ambient air in working sites and released into atmosphere via general exhaust ventilation. Use of gas treatment plants to prevent harmful emissions is evident.

6. Printing industry

In production of printed matters ambient air in the working area catches a lot of pollutants (contaminants) which comprise solvents of various origins (**alcohols, ketones, aromatic hydrocarbons and other**).

The mentioned substances contained in the working area ambient air produce harmful effect at least on personnel. In addition, release of organic substances into atmospheric air is regarded as environmental pollution and penalized in compliance with current regulations.

PlazKat Aero plant ensures removal of solvents from emissions from the following printing equipment:

1. Flexographic presses.
2. Solvent printers.
3. Laminators and other printing equipment.

7. Iron and steel and metal working

Metal casting and heat treatment processes are associated with harmful emissions into atmosphere which include such substances as **carbon oxide, nitrogen oxides, oil vapors and sulfur dioxide**. Investment casting yields significant concentrations of **saturated hydrocarbons (paraffin), acetone and isopropanol vapors**. In precision casting contaminants evolve on curing of mix that contains phenol-formaldehyde resins including **phenol, formaldehyde, and methanol**. On treating items, solvent ingredients are released into ambient air. Sources of significant amounts of air contaminants comprise steel tempering sites.

Arc welding with stick electrodes is associated with evolvement of **fluorides, nitrogen dioxide, and carbon oxide**.

PlazKat Aero plants allow neutralization of the above substances**.**

8. Woodworking

Significant air pollution occurs during wood milling and production of such popular materials as plywood, wood-chip and wood-fiber materials, and paper. In terms of air and water pollution almost all wood impregnation and heat treatment operations are harmful, for instance, sleeper impregnation and production of thermowood.

Air treatment systems are indispensable for gluers, veneer impregnation chambers, hot presses, dryers, sites for natural resin processing other equipment of which operation yields harmful substances of concentrations that exceed MAC, in particular, **phenol, formaldehyde, ammonia, turpentine, and alcohols.**

PlazKat Aero plants allow neutralization of the above substances to elementary compounds.

9. Food

PlazKat Aero plants may be installed in large-scale food production facilities, including:

– confectionary;
– production of chewing gum and candies;
– bakery, and
– coffee roasting shops.

In the aforementioned operations main pollutants comprise products of raw material heat treatment, in particular, **carboxylic acids (acetic and formic), aldehydes (formaldehyde), and ketones (acetone).**

10. Motor vehicles and diesel generating sets

PlazKat Aero plants are used to treat emissions from motor and railroad vehicle.

It has been found that exhaust gases from internal combustion engines contain over 250 ingredients. Major components include **carbon oxides, nitrogen oxides, and hydrocarbons.**

Plant applications:

1. Parking lots (underground, inground).
2. Road tunnels.
3. Garages in motor vehicle fleets (bus fleets, truck fleets)
4. Motor car service stations.

5. Railroad ecological points (rheostatic diesel-powered locomotive tests)
6. Diesel-generating sets.

11. Smell removal (neutralization) in waste treatment facilities

PlazKat Aero plants are used to neutralize smells in waste treatment facilities caused by sulfur and nitrogen compounds including hydrogen sulfide, mercaptans and ammonia. Urban waste treatment facilities, local treatment systems in production facilities and pump stations in wastewater canalizing systems are characterized by strong smell of sulfuric and nitric compounds.

Our equipment is used for treatment of the aforementioned compounds. High treatment efficiency makes it possible to reduce strength of unpleasant smells 10-25 times. Use of these plants allows strong smell issue to be addressed in the whole facility. For the purpose of reducing capital costs for treatment plants they may be installed next to the source of release and predilution with air may be omitted.

Substances to be neutralized are as follows: **hydrogen sulfide, methylmercaptan, ethylmercaptan, dimethyl sulfide, dimethyl disulfide, and ammonia.**

Plant applications:

1. Treatment of exhaust ventilation in rooms of sewerage pump stations.
2. Treatment of ventilation on sludge drying beds.
3. Cleaning of rooms in shops of emission mechanical treatment.
4. Treatment of ventilation emissions in wastewater manifolds.
5. Treatment in open settling pits.

EMISSION TREATMENT EFFICIENCY USING PLAZKAT AERO PLANTS

Really, there are a few major techniques to acquire information about efficiency of gas treatment equipment:

1. Reports on treatment of emissions in similar operations drawn up in independent certified laboratories which show treatment efficiency regarding to each substance in emissions. The report may be found on the Company's official site at www.ele-spb.ru. Below is a summary table which tabulates pollutants, major industries and treatment efficiency.

harmful substance	Concentration suppression efficiency, %						
	Major industries						
	Paint making and printing	Heat supply and iron and steel	Chemical and petrochemical	Casting and processing of plastics and polymers	Pulp-and-paper	Perfumery, chemical	Food, cattle breeding
1	2	3	4	5	6	7	8
Nitrogen oxides		85-92					
Acrylaldehyde						94-98	93-95
Ammonia			93-95				93-98

Acetone Acetaldehyde benzene	92-95 96-99.9	93-96	83-90	80-85		93-96	
Benzpyrene Butanol Hexane	93-95 95-98.4	95-98	94-97				
Dimethylsulfide Xylene Carboxylic acids Methane	92-95				87-91	93-95	93-95 90-93
Mercaptans Hydrogen sulfide Sulfur dioxide Solvent	90-92	83-92	80-82		93-97 92-95		92-97 92-95
Styrene Toluene Hydrocarbons carbon oxide	90-95	92-98 85-92	92-98	93-97 92-98		92-98	92-98
Phenol Formaldehyde Ethanol	92-98	93-98		93-98 87-91			93-98 87-91

2. At CUSTOMER'S option pilot testing may be undertaken immediately at the CUSTOMER'S production facility.

Advantages of pilot testing:

- CUSTOMER'S technicians acquaint themselves with operational features of gas treatment equipment and may receive on-site engineering advice;
- Treatment of emissions from a specified source is undertaken at the CUSTOMER'S production facility;
- There is an opportunity to conduct testing under various working conditions of the source of emissions (for instance, under full load on basic process equipment which results in greater content of harmful pollutants in emissions etc.)

Equipment for pilot testing

Equipment includes: plasma catalytic reactor, flow booster (exhaust fan), and power supply unit (transformer).

The pilot air treatment plant is connected to the pollution source. This plant is capable of treating about 850 m^3 of contaminated gas and air mix per hour. Air flow passes through the plasma catalytic reactor where it is exposed to various physical and chemical factors including low-temperature gas-discharge plasma, chemically active radicals, local thermal shock within the streamer zone, ultraviolet radiation etc. A short period of time (10^{-5} s) is required for formation of breakdown products of excited and ionized substances which contact with the catalyst or chemical absorbent in the reactor where they are completely decomposed down to elementary non-toxic compounds or contact with surface of the chemical absorbent, and a deep oxidation (reduction) reaction occurs. Active atomic oxygen and hydroxyl ions generated due to electric discharge react with pollutants which facilitates their rapid decomposition.

Pilot testing is conducted by competent mechanical engineers who optimize characteristics of the pilot air treatment apparatus due to regulation of the following parameters:

- Specific energy value per unit of gas treated.
- Type of catalyst.
- Gas flow rate in reactors of the air cleaner.
- Time of catalyst saturation with products of decomposition.

Basic steps of pilot testing

a. Preliminary step

- origination of measurement charts in compliance with gas treatment plant test schedule;
- selection of chemical analysis procedure;

b. Installation and commissioning

- installation of the air treatment plant in the place of testing;
- installation of instruments to monitor parameters of the plant and gas-and-air mix;
- air treatment plant performance trial and setting parameters required;

c. Test procedure

- air treatment plant start-up for continuous operation at preset flow rate of gas-and-air mix;
- metering at the plant input and output of volumetric flow rate, velocity, gas temperature, and total aerodynamic drag of reactors;
- once aerodynamic parameters have been set, gas-and-air mix is fed to the plant reaction zone and gas is sampled at air cleaner input and output to determine gas treatment efficiency;
- characteristics of the air cleaner are optimized, and
- the results are recorded in tables and metering tables are attached.

d. Report origination

Results of the pilot air treatment plant tests are put down in two documents:

1. Report on pilot air cleaner tests.
2. Statement of the joint commission which shows the following:
   - air cleaner efficiency in gaseous substance suppression;
   - air cleaner use restrictions, and
   - recommendations for use of the PlazKat Aero industrial air treatment plant.

3. At CUSTOMER'S option the laboratory of our Company may conduct bench tests.

Advantages of bench tests:

- There is an opportunity to determine treatment efficiency with specific and rare substances (for instance, aromatizing agents), and
- Tests are possible when CUSTOMER'S facility is designed rather than erected. At this step model emission chemistry may be prepared on the basis of process description and treatment efficiency data obtained may be used as the basis for design of facility treatment systems.

We have PlazKat Aero pilot plasma catalytic treatment plant of about 850±50 m^3/h capacity.

Bench test flowchart

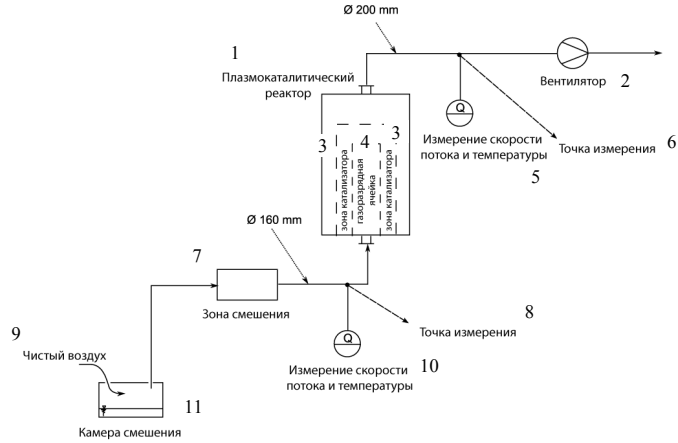
As is known, emission chemistry in production facilities is multi-component and the substances belong to different classes. Our process engineers on the basis of the data provided by a CUSTOMER may create a model multi-component emission chemistry which is as close to the real chemistry as possible.

Possible model chemistry:

- alcohols (methanol, ethanol);
- ketones and aldehydes (acetone, formaldehyde);
- aromatic hydrocarbons (xylene, phenol, toluene);
- carboxylic acids (acetic acid, formic acid);
- non-organic substances (ammonia), and
- specific complex mixtures in the CUSTOMER'S facility (for instance, liquid for sleeper impregnation, aromatizing agents;

Concentration of substances in the model chemistry for single-step treatment varies from 10 to 2,000 mg/m^3.

In bench tests a number of samples of model emission chemistry are taken prior to and after treatment in the pilot plant to be analyzed in an independent certified laboratory. In this case the reports indicate emission treatment efficiency.



1 – plasma catalytic reactor; 2 – fan; 3 – catalyst zone; 4 – gas-discharge cell; 5 – flow rate and temperature metering; 6 – metering point; 7 – mixing zone; 8 – metering point; 9 – clean air; 10 – flow rate and temperature metering; 11 – mixing chamber

OUR CLIENTS


АПАТИТ
ОАО «АПАТИТ»


ARTERIUM


Разработано для жизни
BOSCH


ЭЛЕКТРОН


ICN

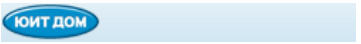

Невская
Косметика


ПОЛЮС


РАНТ


САМАРСКИЙ
РЕЗЕРВУАРНЫЙ
З А В О Д


SAMSUNG


ЮИТ ДОМ


ВОДОКАНАЛ
САНКТ-ПЕТЕРБУРГА


АКЦИОНЕРНОЕ ОБЩЕСТВО
ВКДП
ВОЛГОДОНСК


WESTWOOD
TIMBER GROUP

ЭЛЕКТРОЭКОЛОГИЯ
ELECTRICAL ECOLOGY

APPLICATION FOR GAS TREATMENT
QUESTIONNAIRE

Date of filing:	___.___.20___

Customer:_____
Country, city:_____ ***URL:***_____
Contact:_____
Title:_____
Tel.: _____***; Fax:***_____***;***
E-mail:_____

☐ *Production facility* ☐ *Equipment vendors (B and K)* ☐ *Private individual*
☐ *Design organization* ☐ *Investment company* ☐ *Other*

How you acquired information about company and equipment:

☐ *Internet* ☐ *Reference books*
☐ *Mailing* ☐ *Other (describe)*_____

1. general data on source of emissions:

Industry	
Process	
Purpose of treatment	

2. Characteristics of source of emissions:

Flow rate of tail gases, m^3/h	
Temperature of tail gases, ^0C	
Moisture content in tail gases, %	
Dust content in tail gases, mg/m^3	
Required treatment efficiency, %, at least	
Pressure (+) or depression (-) at gas cleaner inlet, Pa	
Description of harmful substances: chemistry, concentration, MAC, mg/m^3:	
Hoe air (gas) was treated before (flowchart, equipment, treatment efficiency):	
Plant's required operating conditions (shift, hours)	
Ambient air temperature in gas treatment area, ^0C	
Restrictions on electric power requirements	☐ *Yes* ☐ *No*
Rules and regulations to be observed	☐ *Yes* ☐ *No*
Required deadline of gas treatment equipment delivery	
Engineering with approval ☐ *or delivery only* ☐	
Note or additional information	

3. Characteristics of the plant to be used:

☐ *Local with closed air circulation* ☐ *Cleaning of forced ventilation* ☐ *Treatment of industrial emissions*

You are requested to fill in the questionnaire as complete as possible. This shall allow our employees to reply to your request soonest.

For notes