Technological Institute
of Plasma Application

www.plazkat.cz
www.plazkat.com

INTRODUCTION

Technological Institute of Plasma Application s. r. o. was established in 2017. From the very beginning, it has been dedicated to research and development in the field of air decontamination. Protecting the industrial environment through Innovative plasma-catalytic technology inspired by nature has become our long-standing goal.

Today, our company offers three models of air purification equipment, which correspond to the names of the technologies. These are installations of different designs under the brand names **PLAZKAT™, OXIZ™, OXICAT™**.

All models of our equipment can be attributed to one type of equipment and gas purification systems under the general name of or **Gas Electric Filter (GEF) PLAZKAT**.

GAS

Means that this type of installation is used only to clean the air of smoke, mist, vapors, gases and odors.

ELECTRIC

Means that the air is treated under the influence of an electric field, plasma and active particles created in the plasma during an electric discharge.

FILTER

Means that this type of equipment and systems is designed to clean the air of odors and harmful emissions.

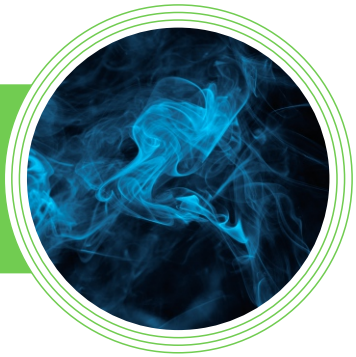
PLAZKAT TECHNOLOGY

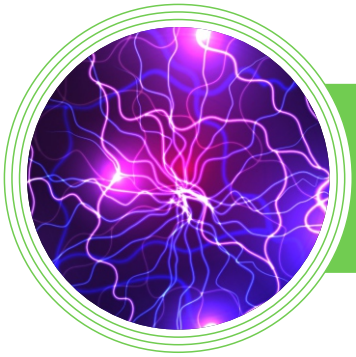
EMISSION SOURCE

Various industries, business work areas, household pollution sources

COMPOUNDS: CO, NO_x, SO_x, H_2S, C_6H_6, VOC

Chemical and biological industrial waste, combustion products (smoke, carbon monoxide), air of household areas



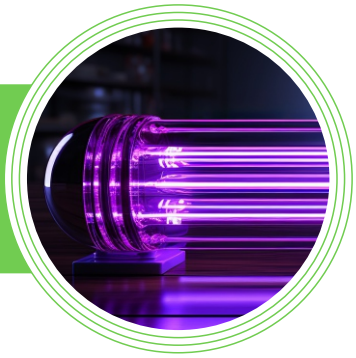


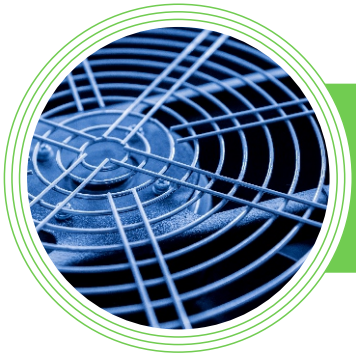
PLASMA-CHEMICAL STAGE

Reactor, where active particles and plasma flows are formed with dielectric barrier discharge

CATALYST STAGE

Chemical reactor, where toxic gases are converted to non-toxic in the course of oxidation-reduction reactions





EJECTION FAN

UNIQUE PROPERTIES OF THE UNITS

1 | HIGH PERFORMANCE COMBINED WITH LOW ENERGY CONSUMPTION

The efficiency of filtering in PLAZKAT™ units is steady and reaches 95 %.

2 | PERFORMANCE REMAINS HIGH EVEN IF CONCENTRATION OR VOLUMETRIC VELOCITY RATE IS CHANGED

Weather conditions do not affect the operation dramatically, the equipment also functions with the same cleaning performance at different temperature of input gases (from -20 up to +120 °C)

- Changes in the gas flow to be cleaned in 10 % do not have any impact on the operation of the unit.
- Units work with the same efficiency when concentrations of waste ingredients differ up to 50 % at 2 hours.
- The equipment functions equally well in non-stop working mode as in random mode.

3 | INSTANT START AND INSTANT SHUT-OFF

4 | NO WASTE LEFT AFTER FILTERING

- Harmful substances are eliminated without formation of solid or liquid waste.
- The equipment is capable of removing both organic and inorganic pollutants.
- Eliminated organic compounds fall within the range from 1 mg to 1000 mg in 1 m^3 of air.

5 | BLOCKS PRINCIPLE OF CONSTRUCTION

TYPES OF PLAZKAT UNITS

NAME (MODIFICATION) OF PLAZKAT UNITS

OXIZ™

is designed for household, storage, and industrial premises to remove odors and harmful substances of low concentration (up to 50 mg/m³), at the rate of air exchange up to 100 thousand m³/h

OXICAT™

is designed for large manufacturing facilities to remove strong odors, harmful substances, and sprays of medium concentration (up to 200 mg/m³), at the rate of air exchange up to 100 thousand m³/h

PLAZKAT™

removal of strong odors, harmful substances, and sprays of high concentration (up to 2 g/m³) at the rate of air exchange up to 100 thousand m³/h

APPLICATION AREA

Chemical industry

Oil and gas refining

Coal mining and processing

Pharmaceutical industry

Shaping and production of plastics

Production of paints and varnishes

Production of printed matter

Casting and processing of metals

Production of plywood

Food production

Pollution by combustion engines

Odor from sewers, trash cans, landfills

PLASMA-CATALYST UNITS

OXIZ™

Purpose of the unit:

The equipment is designed for air filtering of production facilities to eliminate smoke, odors, and sprays of low-concentration.

Application area:

household, storage, and industrial premises, as well as public catering enterprises

Installation site requirements:

- used in rooms with general ventilation
- indoor areas, including recirculation rooms

Operation principle:

- Air is fibered as a result of exposure of plasma reactions to molecules of harmful substances.
- Air to be cleaned is delivered into the unit OXIZ™ and moved through it with the help of a ventilation fan.

Characteristics of filtering technology:

- Application of low-temperature catalyst without precious metals, which operates effectively in the range within +5 ... +50 °C thanks to the use of plasma.
- The machine does not consume water and does not produce solid waste. Filtering is performed by dry method, whereas only electrical energy is required.

TECHNICAL CHARACTERISTICS OF UNITS OXIZ™

AIR FLOW RATE	100 ÷ 7 000 m³/hour
EFFICIENCY	over 85 %
TEMPERATURE OF INPUT UNFILTERED AIR	+5 ÷ +50 °C
RELATIVE HUMIDITY TOLERANCE	up to 98 %
AERODYNAMIC RESISTANCE	300 Pa
ELECTRIC POWER CONSUMPTION	400 V, 50 Hz, 20 A
CATALYST VOLUME FOR 1000 M³/h	Not need
WASTE CONCENTRATION of CxHy	5 ÷ 50 mg/m³
AMBIENT AIR TEMPERATURE	+5 ÷ +40 °C
DUST INLET CONCENTRATION	Not limited
DIMENSIONS	Container 20 ft.

PLASMA-CATALYST UNITS

OXICAT™

Purpose of the unit:

The unit is designed for air tearing of production facilities to remove smoke, odor, gases, and a spray of low concentration.

Application area:

- In general ventilation systems.
- Odor and emission elimination at indoor premises, including recirculation rooms.
- Cleaning of waste local systems exhaust ventilation to remove harmful substances with concentrations up to 200 mg/m^3.

Operation principle:

- Air is there as a result of exposure of plasma reactions to molecules of harmful substances.
- Air to be cleaned is delivered into the unit OXICAT™ and moved through it with the help of a ventilation fan.

Characteristics of filtering technology:

- Application of low-temperature catalyst without precious metals, which operates effectively in the range within +5 ... +120 °C.
- This process slows to deeply all toxic and harmful organic compounds.
- The machine does not consume water and does not produce solid waste.
- Filtering is pertained by the dry method, whereas only electrical energy is required.

TECHNICAL CHARACTERISTICS OF UNITS OXICAT™

AIR FLOW RATE	1000 ÷ 30 000 m³/hour
EFFICIENCY	80 - 95 %
TEMPERATURE OF INPUT UNFILTERED AIR	+5 ÷ +120 °C
RELATIVE HUMIDITY TOLERANCE	up to 98%
AERODYNAMIC RESISTANCE	before 1200 Pa
ELECTRIC POWER CONSUMPTION	400 V, 50 Hz, 75 A
CATALYST VOLUME FOR 1000 M³/h	210 l
WASTE CONCENTRATION of CxHy	5 ÷ 1000 mg/m³
AMBIENT AIR TEMPERATURE	-20 ÷ +40 °C
DUST INLET CONCENTRATION	Less than 20 mg/m^3
DIMENSIONS	According the project design

PLASMA-CATALYST UNITS

PLAZKAT™

Purpose of the unit:

The unit is designed for air tearing of production facilities to remove smoke, odor, gases, and a spray of low concentration.

Application area:

- In special ventilation systems and aspiration of different plans lines.
- Also can be used to odor and emission elimination at indoor premises, including recirculation rooms.
- Cleaning of waste local systems exhaust ventilation to remove harmful substances with concentrations up to 1500 mg/m^3 and more with special prepareing systém.

Operation principle:

Inside the PLAZKAT™ unit, the contaminated air is cleaned using a plasma-catalytic reaction. Plasmochemical and plasma-catalytic methods enable the decomposition of gaseous contaminants. The contaminated air is drawn through the PLAZKAT™ unit by means of a fan. The PLAZKAT™ unit contains modules (plasma catalytic reactors) arranged so that the incoming air is evenly distributed between the modules. Each module can process a contaminated mixture in the range of up to 1000 m^3/h.

Characteristics of filtering technology:

- Application of low-temperature catalyst without precious metals, which operates effectively in the range within +5 ... +80 °C.
- This process slows to deeply all toxic and harmful organic compounds.
- The machine does not consume water and does not produce solid waste Filtering is pertained by the dry method, whereas only electrical energy is required.

TECHNICAL CHARACTERISTICS OF UNITS PLAZKAT™

AIR FLOW RATE	1000 ÷ 100 000 m³/hour
EFFICIENCY	80 - 95 %
TEMPERATURE OF INPUT UNFILTERED AIR	+5 ÷ +80 °C
RELATIVE HUMIDITY TOLERANCE	up to 98%
AERODYNAMIC DRAG	up to 1 000 Pa
ELECTRIC POWER CONSUMPTION FOR 1000 M³/H	400 V, 50 Hz, 500÷3000 W (depends on concentrations and gas pollutants)
CATALYST VOLUME FOR 1000 M³/h	180 - 210 l
WASTE CONCENTRATION of CxHy	5 ÷ 10 000 mg/m³
AMBIENT AIR TEMPERATURE	-20 ÷ +40 °C
DUST INLET CONCENTRATION	up to 10 mg/m^3
DIMENSIONS	According the project design

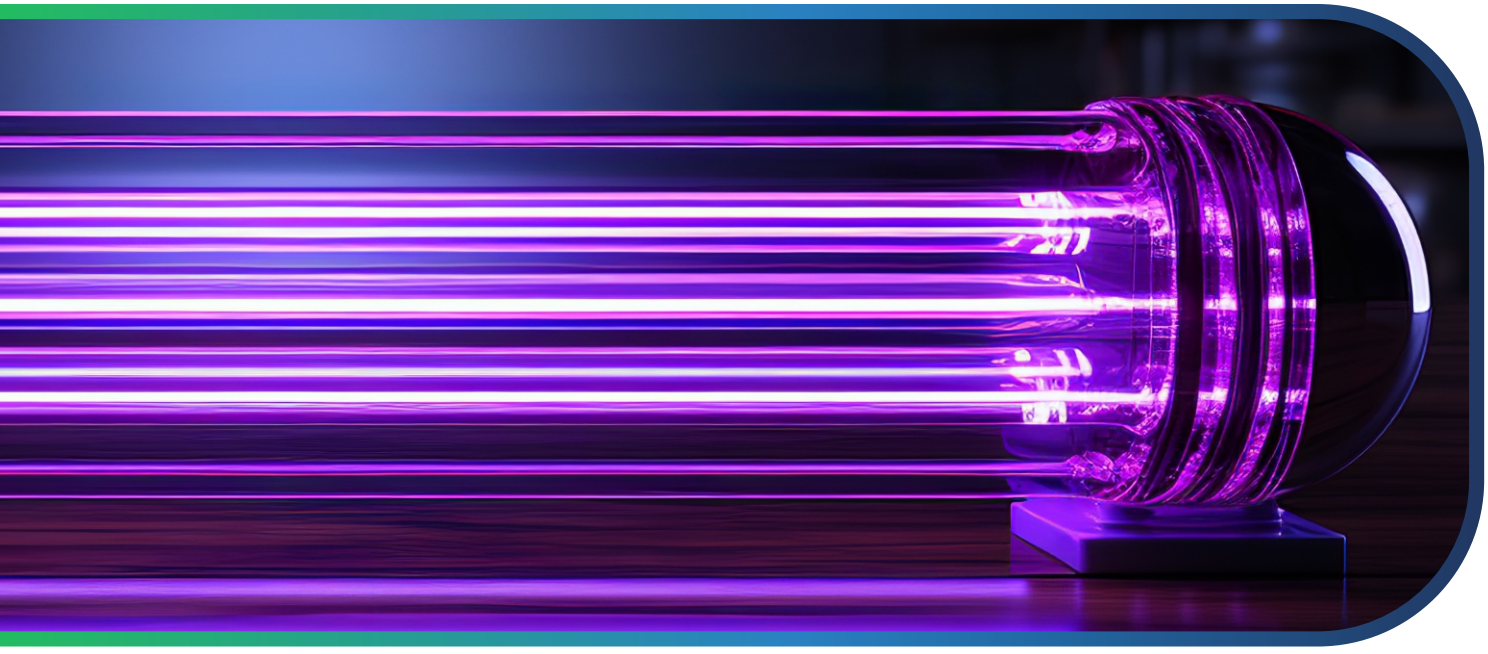
REACTOR CONSTRUCTION OF PLAZKAT UNIT

CATALYST & PLASMA MODULES

The plasma-catalyst reactor consists of two parts. The inside part is a gas-discharge module produced by our know-how, which constitutes a construction with a set of gas-discharge cells, facilitating the plasma-chemical stage of filtering.

The next part is a special volumetric cylinder with a catalyst. In reactors can be used catalysts of different types, as a rule, based on aluminum oxide. Catalyst modification is determined according to the chemical composition of the filtered air.

In compliance with the warranty catalyst's lifespan amounts to at least 7-10 years.



REACTOR CONSTRUCTION OF PLAZKAT UNIT

POWER SUPPLY UNIT BOX

- different types of transformers are used in different units
- outside installation option
- easy to install and maintain

The core of power supply unit is a high-voltage transformer with a throttles. The high-voltage transformer is separated from reactors and the power supply control unit in special cases. To energize the power supply unit of PLAZKAT™ plant there is a cable input with a double PVC layer without inner protective coating into the gas filtering room, 400 V, 50 Hz. Cable 0,4 kV is routed to the control cabinet. High voltage cable is laid from the transformer to the plasma-chemical reactor in a metal tube. High voltage cable does not cause interferences to electronic processing equipment.

CONSOLE CONTROLE SYSTEM

- modbus connection option
- it is possible to install GPS telemetry
- completely automatic control

The "PLAZKAT™" plant is controlled by an indication unit of the control board or by the operator's console from the technological equipment room, with sound or light alarm signaling in emergencies. The unit control board is designed for the control and adjustment of electric parameters of "PLAZKAT™" reactor units. as well as locking systems, ensuring the safety of the whole unit.

ADVANTAGES

Our Air Purification System are optimal for any production because:

- PLAZKAT™ starts and stops at the push of a button. The same filter with different emissions can be used without loss of energy.
- Different weather conditions do not affect the filter operation and at different inlet gas temperatures the unit continues to operate without loss of cleaning stage.
- The OXIZ™ filter model cleans the air of odours and harmful gases in any dusty environment.
- The filter is operated remotely. The GSM module has a special system for this.
- As long as the emission concentration during the process cycle is between 5 and 2,000 mg/m^3, the cleaning efficiency not change dramatically.
- Different numbers of emission sources can be connected to one GEF PLAZKAT™.
- The cleaning air volume starts at 500 m^3/h and the volume can be increased by a simple set of same reactors.
- No solid or liquid waste is generated after removal of harmful gases.
- The lifetime of PLAZKAT™ units without refurbishment is 6-7 years.
- PLAZKAT™ filters are capable of removing organic and inorganic gases from emissions.
- The cleaning efficiency of all PLAZKAT™ brand filters can reach 80 - 95 %.

APPLICATIONS

WWT PRESSURE SEWER

Air purification technology for sewerages and waste water systems.

- Elimination of odor and excess concentration of H_2S pollution.
- Facility successfully operated since 2019
- At our customer's site, the odor has been eliminated, improvement of air and environmental quality.

Technological parameters

Gas flow rate 500 m^3/h | Pollution type - H_2S | Inlet concentration 200 ppm | Efficiency 80 - 95 %

NANOSPIDER

Nanofibre process air purification technology

- Elimination of odor and excess pollution concentration
- Facility successfully operated since 2021
- At our customer's site, odor elimination, air quality, and environmental improvement have been achieved.

Technological parameters

Gas flow 1500 m^3/h | Pollution type - DMAc, DMF, FA, AA | Inlet concentration 0,55 g/m^3 | Efficiency 80 - 98 %

WATER WAIS TREATMENT

Air purification technology from the waste water treatment plant

- Elimination of odor and excess pollution concentration
- Facility successfully operated since 2022
- At our customer's site, odor elimination, air quality, and environmental improvement have been achieved

Technological parameters

Gas flow rate 1000 m^3/h | Pollution type - H_2S, RSH, VOC | Inlet concentration up to 200 ppm | Efficiency 80 - 95 %

COKING INDUSTRY

Air purification technology from the benzene production process

- Odour elimination
- Facility successfully operated since 2022
- At our customer's site, odor elimination, air quality, and environmental improvement have been achieved

Technological parameters

Gas flow rate 2400 m^3/h | Pollution type - BTX sludge | Outlet concentration 50 ppm | Efficiency 85 - 95 %

OIL RECYCLING

Petrochemical process air purification technology

- Elimination of odor and excess pollution concentration
- Equipment successfully delivered in 2023

Technological parameters

Gas flow rate 1000 m^3/h | Pollution type - VOC | Inlet concentration 300 ppm | Efficiency 85 - 95 %

FUEL DISTRIBUTION

Air purification technology in the transshipment of light oil products

- Elimination of odor in the ship and tanker pumping
- Equipment successfully delivered in 2023
- At the customer's side, elimination of odor, improvement of working conditions for employees

Technological parameters

Gas flow rate 120 - 500 m^3/h | Pollution type - C_6H_6 | Inlet concentration 1000 ppm | Efficiency 85 - 95%

MAINTENANCE OF UNITS

Maintenance services include:

- Inspection and change of dust filters
- Insulation resistance measurement, operating current phases check
- Functionality check of instrumentation and control devices
- Unit sealing restoration
- Electric system inspection
- Inspection and adjustment of plasma reactors
- Inspection and regeneration of the catalyst
- Inspection of aerodynamic parameters of the unit
- Filtering performance check

SUPPLEMENTARY OPTIONS

Supplementary options include:

- Electronic control system
- Server control of the unit operation
- Distant control of the unit
- Ventilations systems design
- Re-fitting of the exhaust ventilation system with PLAZKAT™ equipment
- Start-up tests
- Instrumental examination of emission sources

Technological Institute
of Plasma Application

THE PROCEDURE FOR IMPLEMENTING THE CONTRACT

1. Questionnaire
2. Price offer - preliminary
3. Test
4. Price offer & turnkey project to solve the problem
5. Signing the contract
6. Implementation
7. Support

All of the company's products are CE or EAC certified and come with a minimum 2-year hardware warranty.

The prerequisite for the selection of PLAZKAT™, OXIZ™, OXICAT™ is a set of operating conditions and working requirements. These parameters allow to calculate technical characteristics of filters, to select materials and models. Basic information for filter selection and calculation:

- Where will PLAZKAT™ be used - on the production line or in the project?
- What technology should be used for gas cleaning?
- Which ventilation and air purification system is already installed?
- What pollutants need to be removed from the emission source?
- What is the temperature and humidity of the flue gas?
- What is the concentration of dust in the air during cleaning?
- Concentration of harmful gases in the air during cleaning?
- How much air needs to be cleaned?
- Where should the GEF be located - in the workshop, near the building on the street, on the roof, in a designated room, in a ventilation room, etc.?
- At what ambient temperature will the filter work?
- Is the gas concentration explosive?
- What are the limitations on electricity consumption?
- Other gas cleaning wishes and requirements.

This list of questions can be a starting point for the calculation and selection of PLAZKAT™ equipment.

INSTALLATION PHASES

The production of our products goes through the following phases:

- Selection of the model of gas cleaning equipment
- Design of air purification equipment
- Production and installation of the equipment
- Delivery of the equipment to the site of operation
- Installation and start-up of ventilation with the gas cleaning equipment
- Warranty and service
- Decommissioning of equipment

COMPANY PROFILE

Business name: Technological Institute of Plasma Application s. r. o.

ID: 05670187
VAT ID: CZ 05670187

Address: Mrštíkova 885/4, 709 00 Ostrava – Mariánské Hory

Business premises: Pohraniční 1435/86, 703 00 Ostrava – Moravská Ostrava

The company is registered in the Commercial Register maintained by the Regional Court in Ostrava, Section C, Insert 68826

Area of activity: Purification of air.

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