

MSTN 北京美斯顿科技开发有限公司
MSTN TECHNOLOGIES CO., LTD.

Product Brochure

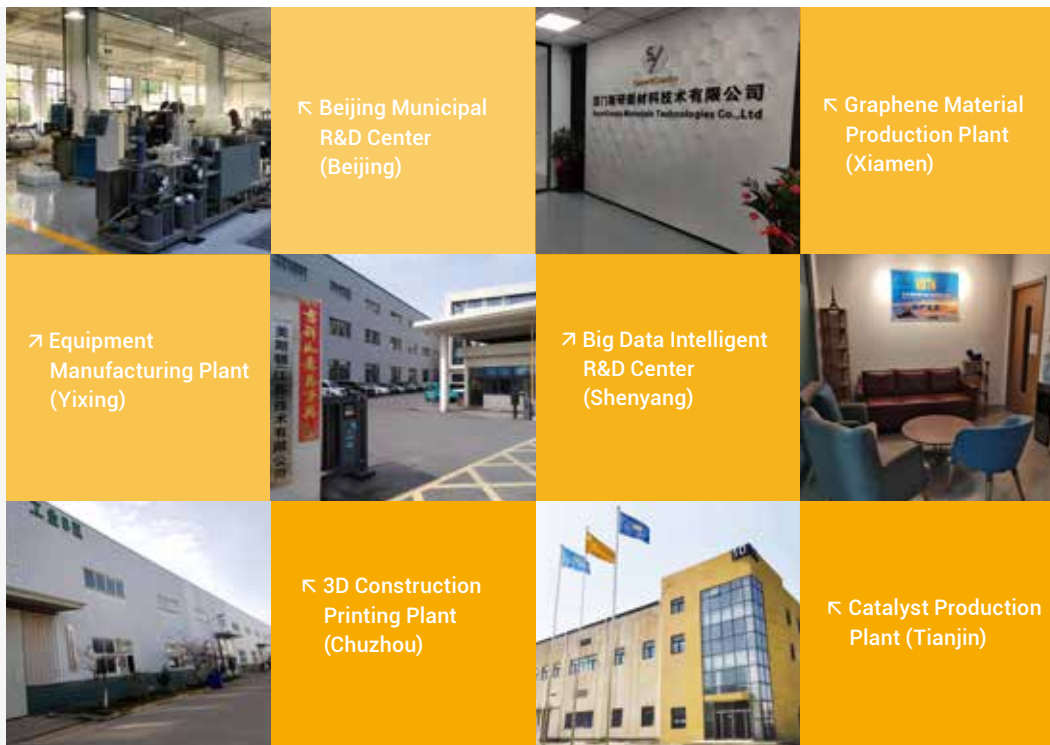


Developing and Protecting, Earth Life Better

► About MSTN

MSTN TECHNOLOGIES CO., LTD. (MSTN) is a national high-tech enterprise that has been committed to environmental protection since 2004. We have obtained certificates of Beijing Technologically Advanced Small and Medium-sized Enterprises, Beijing Gazelle Enterprises, etc. With advanced technologies such as flue gas desulfurization and DeNOx, slurry filtration, water pollution treatment, CCUS, etc., we have gradually become a professional environmental protection company integrating R&D, process design, equipment manufacturing, system integration and EPC, and have nearly 60 patented technologies with independent intellectual property rights. Up to now, we have successfully completed more than 300 projects of flue gas treatment, and more than 50 projects of wastewater treatment, including BT, BOT, EPC and other models.

Now, we have several branches/subsidiaries, 4 production bases and 2 R&D centers, conduct businesses not only in China, also in America, Europe, the Middle East, Southeast Asia and other regions, and have marketed our products all over the world. Adhering to the core values of Proactiveness, Innovation, Service, Respect and Responsibility and in order to realize our vision of "Development and Protection, Earth Life Better", we will keep going in the field of market segmentation, environmental protection, continuous innovation to provide customers with more professional, premium and advanced products and services.



2

R&D Centers

4

Manufacturing Plants

150+

Intellectual Property Rights

300+

Completed Projects In Total

► Honors

- ★ ISO Certificate
- ★ Certificate of new technologies and products
- ★ Graphene-based oil-water separator

- ★ High-tech Enterprise Certificate
- ★ Specialized and Special New Enterprise
- ★ Municipal Enterprise Research Institution of Beijing
- ★ Zhongguancun High Technology Enterprise

- ★ Patents
- ★ Trademark certificates
- ★ Software copyright certificates
- ★ Certificate of new technologies and products



► Contents

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Technologies

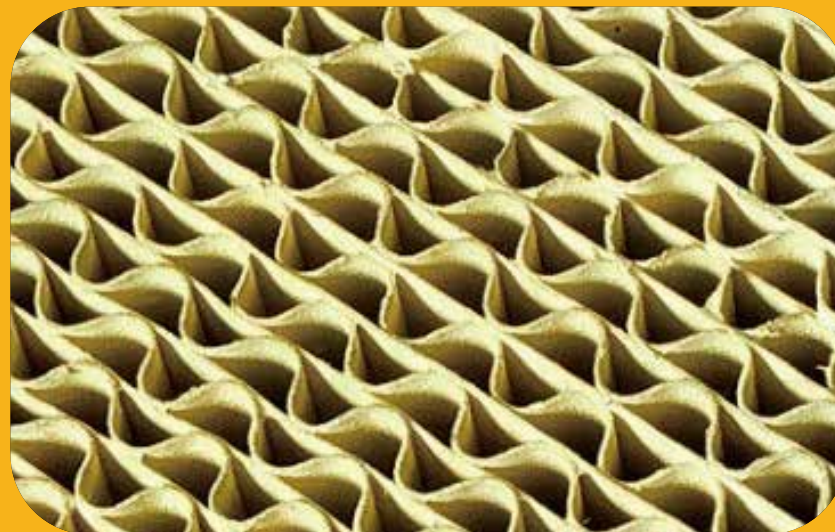
- Process technologies
- Environmental protection technology for new infrastructure



02

Products

- Chemicals
- Biological bacterium agent
- Equipment



Technologies

Process technologies	Flue gas treatment	P01 Desulfurization technology	P02 Wet desulfurization and dust collection technology	
			P02 M-Dwave® reverse jetting technology	P03 M-Sulfurp® acid gas treatment/waste acid recovery technology
			P03 M-Sorb® sulfur dioxide recovery technology	P04 M-HyPerO® oxidative desulfurization using hydrogen peroxide technology
			P04 M-SWFGD seawater desulfurization technology	P05 M-SemiD® semi-dry desulfurization technology
		P05 VOCs treatment technology	P05 RTO oxidation technology	
		P06 DeNOx technology	P06 Low-temperature ozone oxidation DeNOx technology	P06 M-SNCR (selective non-catalytic reduction) DeNOx technology
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	P09 Colored plume elimination technology	P09 M-DePlume® wet FGD plume elimination technology	P09 M-DeSO3 dry alkali spray blue smoke elimination technology	
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	P10 BioCleaning® biochemical treatment of high-salinity wastewater technology			
Environmental protection technology for new infrastructure	P14 Wireless communication technology			
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Process technologies

▶ Flue gas treatment ▶ Desulfurization technology

👉 Wet desulfurization and dust collection technology

It is a wet flue gas alkali washing process and can not only efficiently remove SO_x, also the particulates in flue gas to a large extent. Each functional area is built with independent modules which may be tailored according to project requirements, to make the project technically advanced and economic.

At present, more than 70 systems have been successfully operated in China, including treatment of SO_x and dust from catalytic, coal-fired and oil-fired boilers, MTO and other flue gas emission plants.

Technical advantages

- Realizing desulfurization, denitrification, dust removal, mist removal and other functions at the same time
- Dust can achieve ultra-clean emissions of less than 5mg/Nm³
- Cope with high temperature, running agent and other special working conditions

Para.	Raw gas	Design index
Flue gas flow rate, Nm ³ /h	460,000 wet basis	
SO ₂ CONC mg/Nm ³	1,800 wet basis	≤95 dry basis
Dust CONC mg/Nm ³	Up to 540 dry basis	≤45 dry basis

▶ 3,300,000 t/a Catalytic Cracking Regeneration Flue Gas Desulfurization and Dust Collection Project of a CNPC Petrochemical Company



👉 M·Dwave® reverse jetting technology

M·Dwave system is a wet alkali washing process, featured by simple design and low maintenance. It can not only desulfurize the flue gas and treat the wastewater in one column, but make the flue gas load fluctuation under well control.

At present, more than 20 systems have been successfully operated in China, including treatment of exhaust gas from sulfur recovery, acid water stripping and other plants.

Technical advantages

- Withstand flue gas load of 30-130%
- Withstand normal and high sulfur conditions with automatic system switching
- Efficient waste heat utilization system, no white smoke and rain generation

Para.	Raw gas	Design index
Flue gas flow rate, Nm ³ /h	90,000 wet basis	
SO ₂ CONC mg/Nm ³	Up to 30,000 wet basis	≤60 dry basis

▶ 270,000 t/a Sulfur Recovery Plant Exhaust Gas Purification Project of a CNPC Petrochemical Company

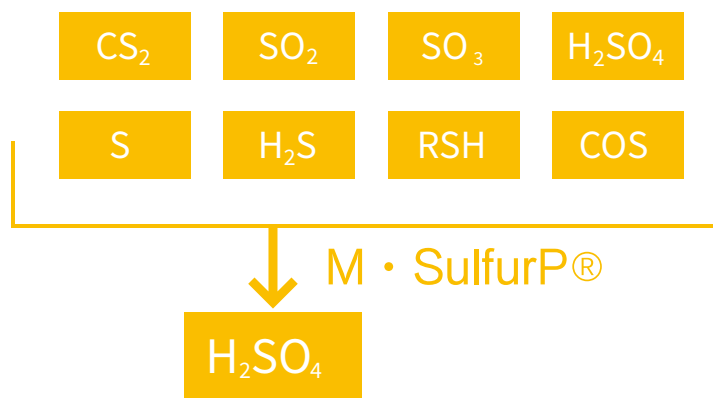


➤ M·SulfurP® acid gas treatment/waste acid recovery technology

This process converts sulfide in sulfur-containing waste gas into 98% concentrated sulfuric acid. Its great advantage is not only to deal with different concentration (high to low) of acid gas but the complex impurities in acid gas. MTO and other flue gas emission plants.

Technical advantages

- It produces 98% concentrated sulfuric acid, which has economic value
- No other chemical or pharmaceutical consumption
- No waste liquid, waste residue, etc
- The system converts SO_2 to 98% concentrated sulfuric acid eventually
- System heat recovery by-product steam



➤ M·Sorb® sulfur dioxide recovery technology

This process uses the organic solvent to absorb SO_2 in flue gas and recycles it. It consists of pre-scrubbing, absorption, and solvent regeneration components. The recycled SO_2 may be used as raw material and fed to sulfur and acid production plants.

Para.	Raw gas	Design index
Flue gas flow rate, Nm ³ /h	72,000 wet basis	
SO ₂ CONC mg/Nm ³	22,770 wet basis	≤70 dry basis

▶ 150,000 t/a Sulfur Recovery Plant Exhaust Gas Treatment Project of a SINOPEC Petrochemical Company



➤ M-HyPerO® oxidative desulfurization using hydrogen peroxide technology

This process uses hydrogen peroxide as an absorbent to absorb SO₂ in flue gas to produce valuable sulfuric acid.

It is mainly applied in acid industry, such as WSA gas emission cleaning treatment.

Para.	Raw gas	Design index
Flue gas flow rate, Nm ³ /h	18,000 wet basis	
SO ₂ CONC mg/Nm ³	1,270 wet basis	≤100 dry basis

▶ WSA Exhaust Gas Treatment Project of a Chemical Plant in Shanghai



➤ M-SWFGD seawater desulfurization technology

This process uses alkaline seawater as an absorbent to remove SO₂ in flue gas. The generated sulfur-containing wastewater is treated through aeration and oxidation before discharge into the sea to realize a closed loop. It is suitable for flue gas desulfurization systems in coastal areas.

Technical advantages

- It requires no additional base feed
- It is a wet flue gas
- It produces no end product

Para.	Raw gas	Design index
Flue gas flow rate, Nm ³ /h	460,000 wet basis	
SO ₂ CONC mg/Nm ³	1,800 wet basis	≤95 dry basis

▶ 2×1000MW Coal-fired Unit Flue Gas Desulfurization Project of a Domestic Coastal Power Plant



✎ M-SemiD® semi-dry desulfurization technology

This process uses alkaline substances such as quicklime, slaked lime, baking soda, etc. to absorb SO₂ and other acid gas in flue gas, while removing dust and other pollutants in it. MTO and other flue gas emission plants.

Technical advantages

- It can remove 98% SO₂
- It directly generates solid waste, without salinity wastewater
- It is best for SO₃ removal, without blue smoke or plume



Process technologies

► Flue gas treatment ► VOCs treatment technology

✎ RTO oxidation technology

This process uses the high temperature environment of the regenerative oxidation furnace to oxidize and decompose the VOCs in waste gas. It has a multi-bed regenerator structure, with each regenerator bed filled with regenerative ceramics. The bed intakes, exhausts or purges by opening and closing the lifting valve, which can not only efficiently decompose VOCs, but also recover and utilize heat.

Technical advantages

- It has a high removal rate, meeting the cleaning emission standard
- It adopts self-lifting valves and multi-stage seal
- Flow field simulation provides a guarantee for the best furnace shape.

Para.	Raw gas	Design index
Flue gas flow rate, Nm ³ /h	10000	
NMHC mg/Nm ³	6700	20

► VOCs Exhaust Gas Treatment RTO Project of a SINOPEC Petrochemical Company



Process technologies

► Flue gas treatment ► DeNOx technology

▣ Low temperature ozone oxidation DeNOx technology

This process uses ozone to oxidize NOx in flue gas into N2O5 which is then effectively removed by an alkali washing system. It is very suitable for wet flue gas desulfurization system due to its high adaptability, minor modification and low investment cost. At present, more than 20 systems have been successfully put into use in China.

Technical advantages

- It is suitable for normal temperature flue gas atmosphere
- Its DeNOx efficiency is more than 90%
- It may be started or stopped as needed
- It consumes no chemicals

Para.	Raw gas	Design index
Flue gas flow rate, Nm ³ /h	350,000, wet basis	
SO ₂ CONC mg/Nm ³	1,800 wet basis	≤95 dry basis
NOx CONC mg/Nm ³	220 dry basis	40 dry basis

► 3,400,000 t/a Catalytic Regeneration Flue Gas DeNOx of a SINOPEC Petrochemical Company



▣ M-SNCR DeNOx technology

This process uses NH₃ as a reductant to convert NOx in flue gas into N₂ and H₂O in a high temperature environment. It is suitable for the system that has a flue gas temperature window above 800 °C and a low DeNOx efficiency.

Technical advantages

- The reaction temperature should be above 800°C
- Reconstruction of furnace is simple, requiring a small quantity of works
- It has a DeNOx efficiency of 40~60% and can be used together with other DeNOx processes to achieve a higher efficiency and reduce the investment cost

► 2×310 t/h power boiler flue gas denitrification project in a refining company of Sinopec

Para.	Raw gas	Design index
Flue gas flow rate, Nm ³ /h	350,000 wet basis	
SO ₂ CONC mg/Nm ³	150wet basis	80 dry basis

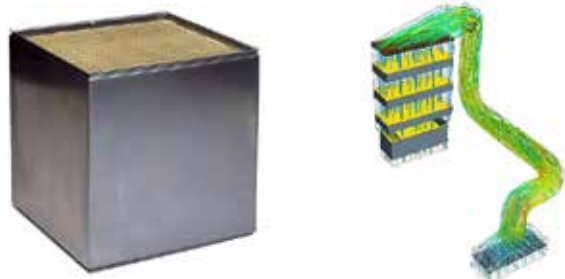


✦ M-SCR DeNOx technology

This process uses NH_3 as a reductant to convert NO_x into N_2 and H_2O under the action of catalyst.

Technical advantages

- The DeNOx catalyst it uses has a wide reaction temperature window from 150 to 550
- Flow field simulation makes the overall design optimized
- It produces no secondary pollutants
- It has a high DeNOx efficiency, meeting the cleaning emission standard
- It is easy to reconstruct and requires a small quantity of works.



Para.	Raw gas	Design index
Flue gas flow rate, Nm^3/h	175000 wet basis	
SO_2 CONC mg/Nm^3	100 wet basis	35 dry basis

▶ 1,000,000 t/a Ethylene Cracking Furnace (6 sets) of a Company



Process technologies

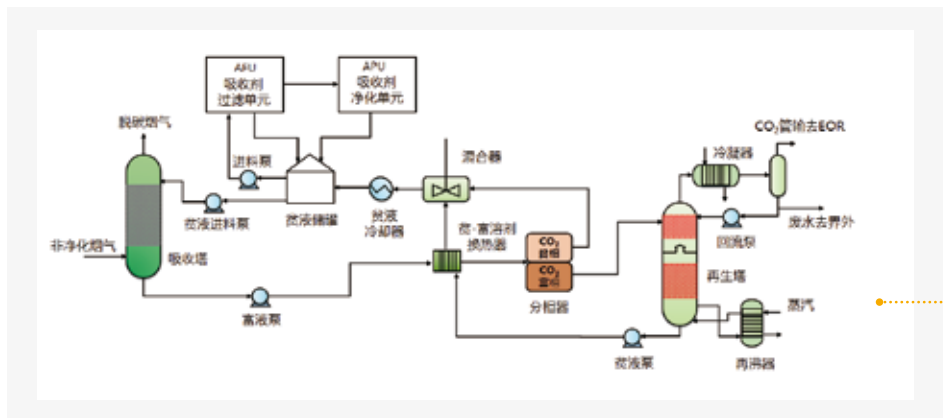
► Flue gas treatment ► Decarbonization technology

👉 M·CO2C carbon dioxide capture technology

This process uses the proprietary two-phase absorbent and unique methods to achieve efficient recovery of CO₂.

Technical advantages

- It can absorb more than 99% CO₂ to the utmost
- The recovered CO₂ has a purity of 98%
- The two-phase absorbent is highly stable, with small loss and no corrosion
- It adopts atmospheric desorption, requiring low energy consumption



► Contrast Before and After Absorption of Amine Solution

● Flow Diagram

- This process uses the proprietary two-phase absorbent which automatically delaminates after absorbing CO₂, with the heavy phase to the analytic column only, thus greatly reducing energy consumption.

Process technologies

► Flue gas treatment ► Colored plume elimination technology

✎ M·DePlume® wet FGD plume elimination technology

It combines condensation, demisting and heating processes to eliminate the plume from wet desulfurization. It can reduce the effect of inorganic salts and acid gas in plume on the surrounding environment, and recover condensate and reduce the energy consumption of desulfurization system.

Technical advantages

- It combines different processes to optimize design with less investment and operation cost
- Flow field simulation makes the system and equipment optimized

Para.	After desulfurization	After plume elimination
Flue gas flow rate, Nm ³ /h	4000	
Flue gas temperature	56	178



► Sulfur Exhaust Gas Desulfurization Plant Plume Elimination Project of a Petrochemical Company in Shandong

✎ M·DeSO₃ dry alkali spray blue smoke elimination technology

This process removes SO₃ by spraying dry alkali (natural alkali, baking soda, etc.) into the high-temperature SO₃-containing flue gas to convert SO₃ into stable sulfate, which is absorbed by the spray system. It is mostly used to control the blue smoke caused by sulfuric acid aerosol from SO₃ in wet desulfurization system.

Technical advantages

- It is simple and easy to reconstruct
- It is designed to prevent dry alkali adhesion during storage and transportation, which makes the alkali efficient and stable
- It can run or stop according to the SO₃ content in flue gas
- It does not produce secondary pollutants
- It has no effect on wet desulfurization system



Process technologies

► Wastewater treatment

✦ BioCleaning® biochemical treatment of high-salinity wastewater technology

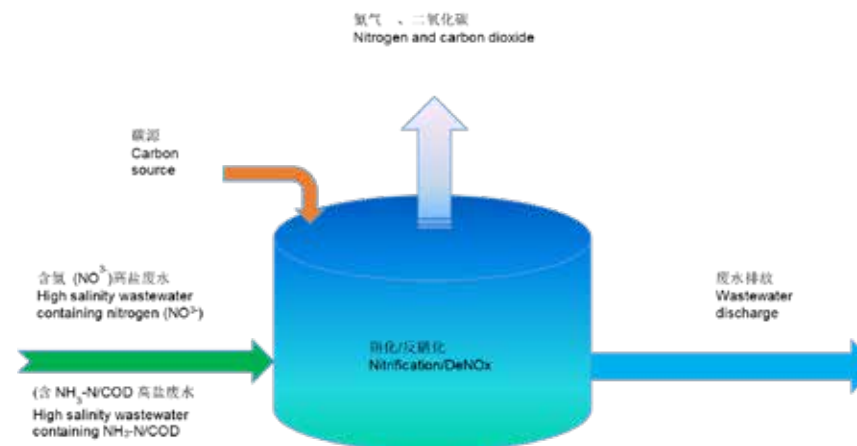
This process uses high-salinity tolerant microorganisms to treat the ammonia nitrogen, total nitrogen, BOD5 and other pollutants in salinity wastewater into stable and harmless nitrogen, carbon dioxide and water.

Technical advantages

- The self-domesticated and cultured high salt-tolerant microorganisms could still maintain high activity at 8%wt salt concentration
- It produces no sludge particles compared with traditional activated sludge
- Microorganisms are added at one time without additional feed
- Microorganisms reproduce and form membranes quickly

Para.	Raw wastewater	Design index
Wastewater flow rate m ³ /h	60	
TDS %wt	7.7	
Ammonia nitrogen mg/L	110	≤4
Total nitrogen mg/L	350	≤25
COD/BOD5 mg/L	120	≤45

► 2,200,000 t/a Catalytic Flue Gas Desulfurization Plant Drainage Treatment Project of a CNOC Petrochemical Company



✎ MSTN®-PTU drainage treatment technology

Processes such as flocculation precipitation, aeration and oxidation, neutralization and heat exchange, etc. are used to make the TSS, COD, pH and temperature of wastewater meet the discharge standard. It is mainly used for the treatment of salinity wastewater from the wet desulfurization system. At present, more than 40 systems have been successfully put into use in China.

Technical advantages

- It uses proprietary chemicals, which offers a good flocculation precipitation and friendly to equipment
- It is a highly integrated system, with a small footprint
- It is simple to operate and stable to run
- It can be applied to the mud dewatering equipment, to make the moisture content in cake water up to 40%wt, and is friendly to the on-site environment.

Para.	Raw wastewater	Design index
Wastewater flow rate t/h	13	
TSS mg/L	5000	≤60
COD mg/L	2100	≤50
PH		6~9

▶ 2,200,000 t/a Catalytic Flue Gas Desulfurization Plant Drainage Treatment Project of a CNOOC Petrochemical Company



✎ M·BlueCrystal® zero emission technology

This process is mainly used for desalination of salinity wastewater from alkali washing desulfurization, oxidation DeNOx and other wet flue gas purification systems. The system combines high pressure flat membrane and evaporative crystallization, greatly reducing its operation cost.

Technical advantages

- There is no need to supplement steam and use cooling water
- The system is supplied with skids for small footprint and easy mounting



Wireless communication technology (M.LoRa)

▶ Smart water

👉 Smart Water – an intelligent solution for biochemical treatment of industrial wastewater

This intelligent solution for the biochemical treatment of industrial wastewater uses the Internet of Things, big data, artificial intelligence and other technologies to make the control and monitoring of the traditional biochemical treatment process computerized, so that the owner may find the root cause of the troubles in the biochemical treatment unit as soon as possible, and then optimize the technical process or take remedial measures in time.

Main applications: It is largely applied to dynamic monitoring of the operation state of wastewater treatment system, identification of abnormal data and emergency alarm, prediction of pollution control effect and calculation of optimal control parameter interval, and solidification of optimal performance control parameter under different load impacts.



Technical advantages

Good adaptation

- The sampling adapter supports the analysis of standard protocols and user-defined protocols, so that different types of devices or instruments may be accessed at the site for automatic data sampling

Machine learning

- It supports the import of microbial characteristic samples. After the official operation of the biochemical treatment unit, the characteristic samples can be independently updated and optimized to improve the accuracy of performance prediction and parameter calculation.

Applications

It is suitable for the industrial field of biochemical wastewater treatment, such as high-salinity wastewater from desulfurization and DeNOx of refining-petrochemical enterprises, high-concentration organic wastewater from pharmaceutical processes of biopharmaceutical enterprises, tail water treatment of high-density circulating water aquaculture enterprises, etc.



Core hardware

The intelligent sensor for biochemical treatment is mainly functioned to connect the sensors or analyzers from which the core sampling indexes of each biochemical tank are read into the system, automatically complete data analysis, classification, labeling, dumping, etc. In addition, it has built-in empirical samples and machine learning algorithms, which allows it to independently learn, optimize samples, predict and yield alarm according to the working conditions and microbial habits of biochemical tanks.










▶ The following is the picture of the intelligent sensor for biochemical treatment and only for reference.

Software platform



▶ The following is the picture of Owner's APP and only for reference

- 
Monitoring of treatment effect of biochemical tank
 influent load, effluent performance status and removal rate.
- 
Abnormal operation alarm
 abnormal data, over-limit alarm and emergency.
- 
Timing tracking of key indicators
 influent concentration, effluent concentration, retention time, performance status and removal rate.
- 
Monitoring of plant load and control parameter
 load state, load value, duration, dissolved oxygen concentration, temperature, PH value and retention time.
- 
Prediction of performance and recommendations for control parameters
 to predict the performance status and occurrence possibility in the future according to the load and control parameters of the current plant, and to provide the optimal control parameter interval to avoid poor performance.
- 
Plant operation log
 it allows for switching between running state and value.
- 
Data filling
 it can meet the application requirements of owners with low degree of data integration.

Wireless communication technology (M.LoRa)

▶ Wireless communication technology

📌 Wireless communication technology (M.LoRa)

MSTN wireless communication technology (M.LoRa) is a new low power WAN communication technology based on LPWAN LoRa. Compared with the original LoRa communication technology, M.LoRa has made overall optimization in transmission timeliness and power consumption, which can not only meet the requirements of real-time transmission, but also ensure the long-term operation in low power consumption mode.

parameters name	parameters
Working frequency band	410.125 - 493.125 MHz
Receiver sensitivity	-138dBm
Over-the-air transmission speed	2.4 - 62.5 Kbps
Transmission distance	15KM
Emission current	110mA
Receiving current	11mA

Technical advantages

- Long transmission distance (sight distance 15KM)
- Low power consumption (up to 3 years of effective battery life)
- High real-time performance (minimum transmission delay up to 15ms)
- High flexibility (movement, increase and decrease of equipment requires no wiring)
- Short construction period (compared with traditional wired communication, the construction period can be shortened by about 70%)
- Low construction cost
- Strong anti-interference ability
- Very convenience (easy to build and operate)
- LAN environment (which greatly improves data security and is easy to manage without traffic charges)

Applications

It is applicable to marginal data acquisition, environmental monitoring, digital factory, IOT workshop, smart agriculture, animal husbandry, storage monitoring, etc.

2

Products

Chemicals		P16 SCR catalyst				
		P16 MSTN-WY composite flocculant				
		P17 Graphene powder/dispersion				
		P18 GO powder/dispersion				
		P19 Graphene Oxide Powder				
		P20 Thermally conductive pad				
		P21 Corrosion and scale inhibitors				
		P22 Defoamer				
Biological agents		P23 Microorganisms for petroleum contaminated soil remediation				
Equipment	Oil-water separation equipment	P24 Hydrophobic-oleophilic filter - Isplitter	P25 High efficiency vortex air flotation separator - Eddyflo	P25 Floating oil collector - Opicker1		
	Filtering equipment	P26 Solid-liquid separation dryer - Aquasolid	P26 Slurry filter - Oslurry	P27 Multi-media filter		
	IOT equipment	P28 Wireless gateway (cTBox)		P28 Wireless gateway (cTBox)		
		P40 RTU	P29 RTU for M.LoRa		P29 AI/DI-LoRa-RTU (unit for analog/digital signal conversion to LoRa)	
			P30 LoRa-AO/DO-RTU		P30 M.POW_E/L (smart posts for pipe network)	
		P42 M.PsnCD		P31 M.PsnCD		
		P43 sHead (wireless meter)		P43 sHead (wireless meter)		

Products

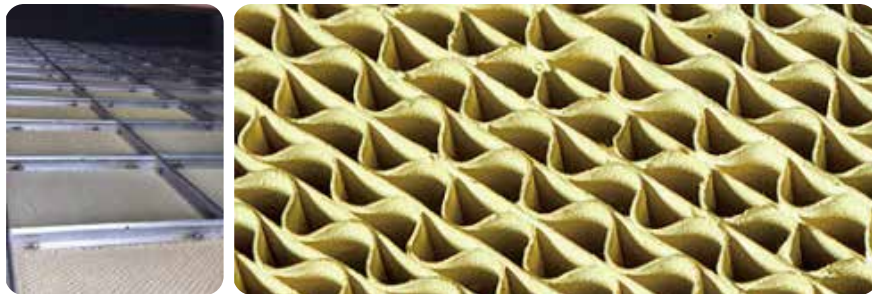
► Chemicals

✦ SCR catalyst

It has a unique corrugated plate structure and undergoes two impregnation and two baking processes to ensure the uniformity of the active substance. In addition, it has "large, medium and small sized" micropores, greatly improving its specific surface area.

Product advantages

- Its specific surface area is twice that of the traditional honeycomb catalyst;
- It has a superior poison tolerance, doubling the chemical lifetime
- Its weight per unit (by volume) is about 50% of the traditional honeycomb catalyst; and
- It is produced domestically, making the lead time guaranteed.



✦ MSTN-WY composite flocculant

MSTN-WY special flocculant is a special composite flocculant for catalytic FGD wastewater treatment, targeting micron particles in wastewater. Using this flocculant, the FGD wastewater can be treated rapidly and efficiently at low cost.



Product advantages

- It can more efficiently remove the particles that are small, light and slow to settle
- It requires a small amount of chemicals
- The flocculated sludge has a low moisture content
- Effluent TSS is stable and up to standard
- It is not corrosive and produces no new pollutant

FGD PTU drainage system of a petrochemical company

► Before dosing



► After dosing



Products

► Chemicals

✎ Graphene powder/dispersion

It is made from natural flake graphite and by chemical oxidation-reduction, mechanical stripping and freeze drying. With such advantages as high purity, large specific surface area, high stability and easy grafting modification, it can effectively improve the electrical conductivity, thermal conductivity, mechanics and mechanical properties of materials, and can be applied to composite materials, conductive inks, sensors and other fields.



Product advantages

Product advantages: It is prepared by the improved Hummers method with uncomplicated equipment and low cost. Graphene is reduced to different degree under different reduction processes, so that different reductants may be used to reduce graphene oxide according to the purposes.

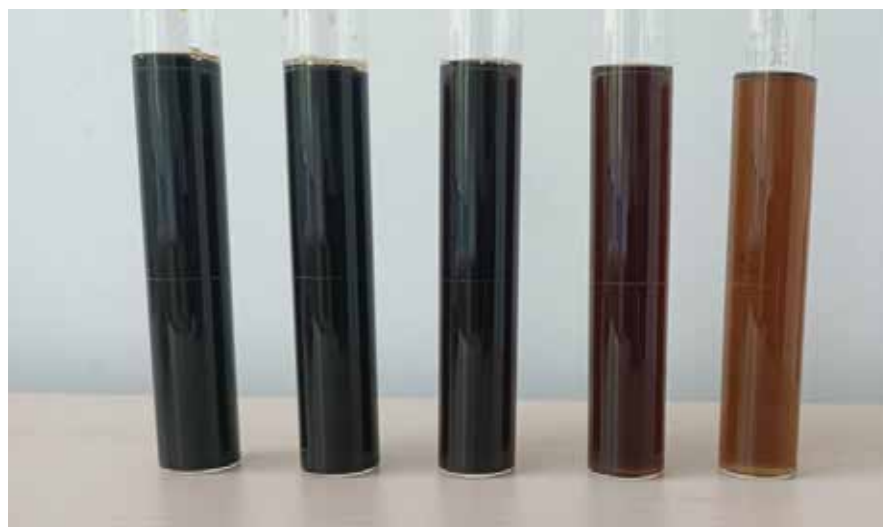
- It has an excellent thermal conductivity and can be used for preparing thermal composite materials, heat dissipation coating, etc.
- It has a lamellar structure and easy to disperse and process
- It is prepared by vacuum freeze-drying process, so that the powder is fluffy and has a large specific surface area
- Compared with conventional graphene, the reduced graphene oxide still retains some oxygen-containing functional groups, and is significantly better than graphene oxide in terms of stability. As an adsorption material, it has a good performance in adsorption of heavy metals and organic dyes.
- It has a better lubricating performance and the less lamellar makes it more wearable, so it is an ideal composite material.
- It can improve the thermal, electrical, mechanical and other comprehensive properties of the material

Products

► Chemicals

👉 GO powder/dispersion

It is made from natural flake graphite and by chemical oxidation-reduction, mechanical stripping and ultrasonic dispersion. It has such advantages as high purity, large specific surface area, etc., and is more active than graphene and easy for grafting modification, so that it can effectively improve the material's electrical, thermal, mechanical, mechanical properties, and can be applied to composite materials, conductive ink, sensors and other fields.



Product advantages

It is prepared by the improved Hummers method with uncomplicated equipment and low cost. A large number of oxygen-containing functional groups provide good hydrophilicity and adsorption properties, so that it has good dispersion stability in water and most polar organic solvents, and is not easy to precipitate.

Graphene oxide dispersion

Appearance	Brown-black paste
Number of floors	1-5 floors
Grain size	<5μm
Solid content	<10%
model	SC-GO2105 SC-GO2205 SC-GO2305 SC-GO2405



Graphene oxide slurry (paste)

Appearance	Brown-black paste
Number of floors	1-5 floors
Grain size	<5μm
Solid content	<10%
model	SC-GO2105 SC-GO2205 SC-GO2305 SC-GO2405



Products

► Chemicals

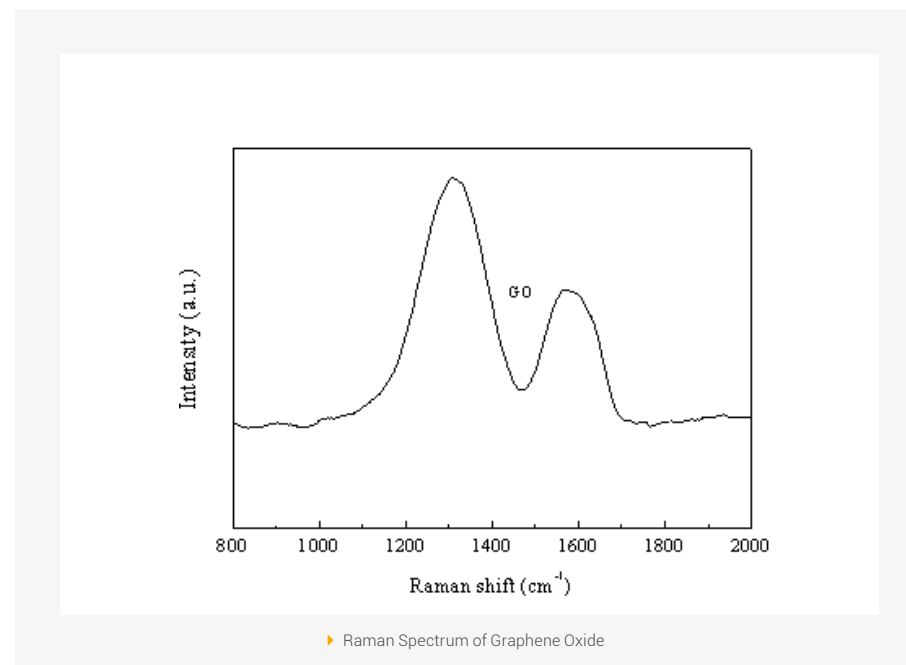
► Graphene Oxide Powder

Specifications

Appearance	brownish yellow powder
Number of layers	1-5
Bulk density	<0.1
Particle size	<5 μ m
Water content	<2%
C/O	Model: SC-GO1005

Product advantages

- Good wettability and surface activity;
- With excellent thermal conductivity, it can be used to prepare thermally conductive composite materials, heat dissipation coatings, etc.;
- High purity, thin layer, stable dispersion, easy to process;
- Compared with conventional graphene, graphene oxide introduces a large number of oxygen-containing functional groups, which can be used as adsorption materials to absorb heavy metals and organic dyes.
- With better lubricating performance, less layers and better wear resistance, it is an ideal composite material;
- It can improve the thermal, electrical, mechanical and other comprehensive properties of materials;



► Photo of Graphene Oxide Powder



► Graphene Oxide TEM

Products

► Chemicals

► Thermally conductive pad

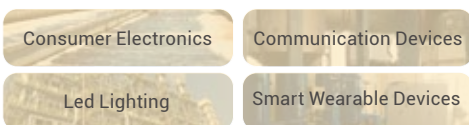
As a kind of thermal interface material, thermally conductive pads are used between various heat sources and heat sinks. By eliminating the air between the heat source and the heat sink, the heat of electronic devices is distributed more evenly and the heat dissipation efficiency is improved. To achieve good thermal conductivity, the shape and size can be die-cut according to customer requirements. The thickness depends on the product gap size and the density, hardness, compression ratio and other parameters of the pad itself.

The carbon fiber with high thermal conductivity is added to the conventional thermally conductive pads, and then is oriented by a special process, so that it has ultra-high thermal conductivity in the vertical direction, which is suitable for various devices generating more heat.

Product advantages

- thickness can be customized
- ultra-high thermal conductivity
- up to 40W/m·K
- and good thermal stability

Applications

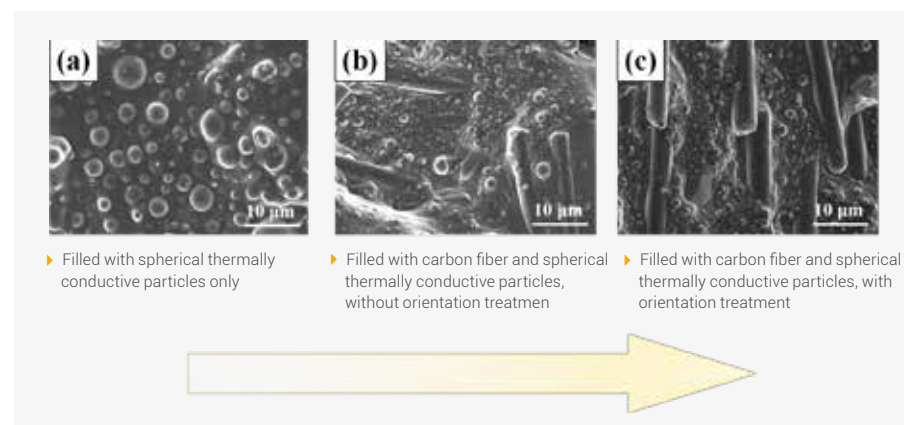


Specifications

Color	Thickness	Thermal conductivity	Density	Hardness	Modulus of compression	Service temperature	Pyrolysis temperature	Sheet resistance
Gray/Black	0.5~5mm	5~40W/m·K	2.5g/cm ³	15(3s)10 (15s)	<2MPa	<150C	407°C	40~100Ω/cm
Visual inspection	ASTMD374	ASTMD5470	ASTMD792	ASTMD2240	ASTMD412	N/A	N/A	ASTM F84

Specifications

Typical dimensions	100*100mm/piece
thickness	0.5-10mm
Storage conditions	store at room temperature and avoid light, with ambient humidity <75%



Products

► Chemicals

✎ Corrosion and scale inhibitors

Composed of a variety of copolymers, dispersants, polycarboxylates, corrosion inhibitors and other components, MSTN-CL series corrosion and scale inhibitors are a mixed-type environmentally-friendly water treatment agent, which are widely used in steelworks, chemical plants, power plants, central air conditioning system, reverse osmosis and other systems with circulating cooling water.

Product advantages

- With excellent corrosion inhibition performance, the rate of corrosion of carbon steel and copper is far lower than the national standard in normal conditions.
- They have good corrosion inhibition performance in corrosive water with chloride ion >300mg/L and high calcium ion and magnesium ion content, and also have excellent scale inhibition performance.
- They boast excellent resistance to high temperature, oxidation and chlorine.
- Free of toxic substances such as nitrites and chromates, they pose no pollution to the environment.

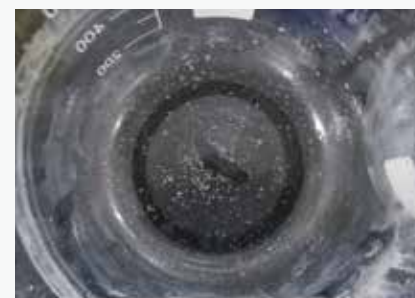
► Dynamic corrosion rate experiments



► Before adding the corrosion and scale inhibitor



► Add corrosion inhibitor corrosion effect



► Before adding the corrosion and scale inhibitor in the beaker scale inhibition experiment



► After adding the corrosion and scale inhibitor in the beaker scale inhibition experiment

MSTN-CL series corrosion and scale inhibitors



► MSTN-CL-22



► MSTN-CL-23



► MSTN-CL-33

Products

► Chemicals

👉 Defoamer

MSTN-DF-22 liquid defoamer is a kind of high-efficiency defoamer for water phase system, which is composed of a variety of organic compounds. It is widely used in sewage treatment, circulating cooling water, industrial circulating water, paper mills, dyestuffs, chemical plants, pesticide water treatment, desulfurization water treatment, foam elimination and suppression in high temperature and strong alkali chemical cleaning and foam elimination in high temperature and strong alkali water phase system.

Product advantages

- ◉ With strong defoaming performance, it takes only a small amount to eliminate the foam effectively and quickly.
- ◉ It is soluble in water and does not float on the surface, greatly reducing production costs.
- ◉ It is free of toxicity, corrosivity and undesirable side effects.
- ◉ It does not react with the defoaming medium, will not be decomposed and degraded by substances in water, and has good chemical stability.
- ◉ It is easy to disperse in water and can be well compatible with liquid products.



► MSTN-DF-22



► Foam effect before adding defoamer



► Effect after adding defoamer

Products

► Biological bacterium agent

✦ Microorganisms for petroleum contaminated soil remediation

For Enland microbial remediation technology for petroleum contaminated soil, indigenous bacterial agents, slow-release oxygen agents, nutrients, soil amendments and the contaminated soil are fully mixed and then transferred to the remediation yard where the petroleum hydrocarbons in the contaminated soil will be rapidly degraded with the help of such technologies as bio-stimulation, bio-addition and slow-release oxygen. The petroleum hydrocarbons in the treated soil is less than five in ten thousand.



Product advantages

▲ Compound indigenous bacteria

The compound indigenous bacteria used are from petroleum hydrocarbon contaminated soil in many places, and the treatment efficiency is high.

▲ Slow release oxygen technology

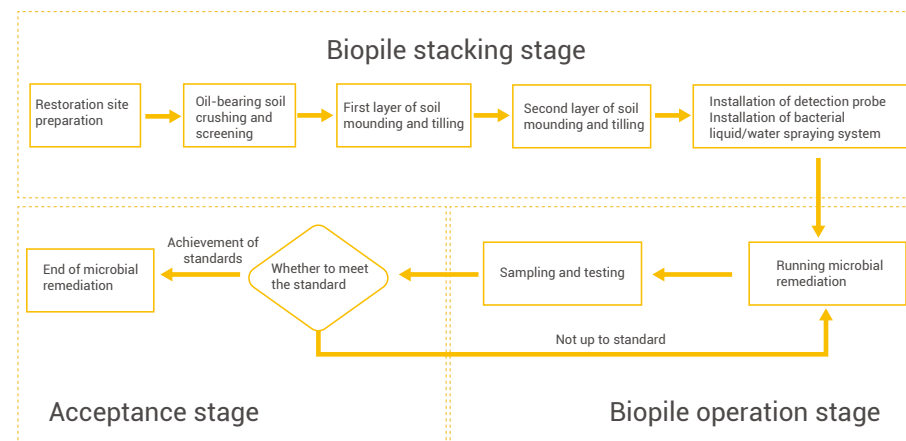
it can significantly reduce the treatment costs.

▲ Bio-stimulation technology

indigenous microorganisms are stimulated to reproduce and grow by improving and correcting the environmental geochemical conditions, eventually enhancing their activity.

▲ Bio-addition technology

The indigenous bacteria decompose different kinds of petroleum hydrocarbon efficiently, so that the soil can be better remediated.



► Indigenous Bacteria Remediation of Petroleum Contaminated Soil

Products ▶ Equipment

▶ Oil-water separation equipment

➤ Hydrophobic-oleophilic filter - Isplitter

A special process is adopted to make the graphene and adsorption material bounded, so that the adsorption material become oleophilic and hydrophobic. In addition, a simple extrusion/back blowing technology is used to completely regenerate the adsorption materials for reuse and reduction of solid waste.



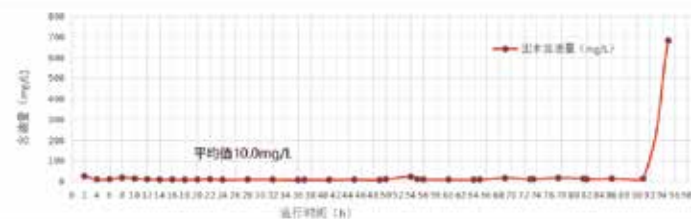
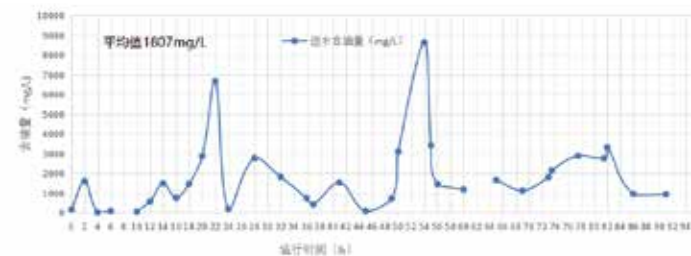
▶ Graphene-based adsorbent materials



▶ Comparison of Influent and Effluent of Tank Farm Oil Wastewater Treatment Project of a Refining-Petrochemical Enterprise

Product advantages

- It can efficiently remove the floating oil, emulsified oil and partially dissolved oil in water.
- The core oleophilic hydrophobic adsorption material can be reused and has a long service life.
- No extra chemicals need to be added, and the regenerated oil has a low moisture content and can be recovered.
- It has a high adsorption rate, adsorbing the crude oil more than 120 times of its own weight (traditional adsorption materials are only about 20 times).
- The oil phase desorption rate is high, up to 95%.
- The adsorption material can be regenerated by simple extrusion or reverse blowing, with low energy consumption.



High efficiency vortex air flotation separator - Eddyflo

The gas dissolution component and the dosing component, a breakthrough improved from the conventional air flotation technology, are integrated, not only making the gas dissolved better, but also reducing the footprint and investment cost. It is mostly used for oil-water separation of produced water in oil production and can replace the traditionally used inclined plate and air flotation device.

Technical advantages

- It is capable of treating a large number of pollutants, 8-10 times of that of the traditional air flotation device.
- It is small and covers a small footprint.
- The compressed gas and chemicals are highly utilized.
- There is a low moisture content in scum.

Applications

Petrochemicals

Oil extraction/refining

Food processing

Vehicle cleaning

Machinery Manufacturing



Para.	Raw wastewater	Design index
Produced water flow	5,000m ³ /d	
Oil mg/L	4000	≤50
TSS mg/L	500	≤50

▶ 5,000m³/d Produced Water Treatment Project of an Offshore Platform



Floating oil collector - Opicker1

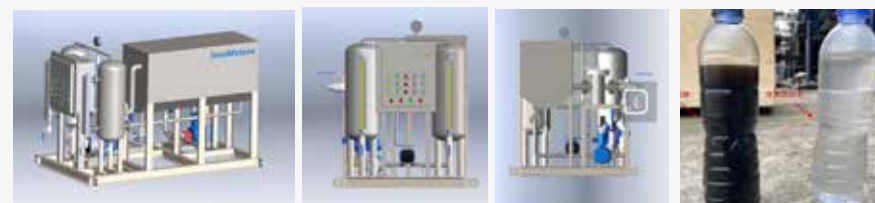
This system, composed of the oil collection and oil-water separation components, uses the oil and water density difference to recover the floating oil on water. It is a purely physical treatment process using the principle of laminar flow and gravity separation. It can be used as an oil collector, and can also be used to separate liquids of different specific gravity. It is a new oil collection equipment that is energy saving, environmentally friendly and efficiently, bringing economic and environmental benefits.



Technical advantages

- It collects floating oil through overflowing under dynamic equilibrium, and can automatically adapt to liquid level fluctuation.
- It collects the floating oil in a fast and efficient way and the oil collection rate can reach 99% in an environment in which the oil-water density difference is large.
- It has such features as reasonable structure, light weight, small size, easy operation, mobility, small footprint and low energy consumption
- It can be manually lifted and is easy to maintain.
- It automatically runs and is easy to operate.

Slop Tank Farm Treatment Project of a Petrochemical Company



Products ▶ Equipment

▶ Filtering equipment

👉 Solid-liquid separation dryer - Aquasolid

It is suitable for filtration of solid containing wastewater in various industries, such as coolant filtration in machining industry, wastewater treatment in electroplating industry, wastewater treatment in food processing industry, wastewater treatment in petrochemical industry, glass industry, mining industry, building materials industry, etc. All filters for solid-containing wastewater are customized to the customer's site conditions and water quality conditions, and can remove particles that are 0.5µm and above.

Product advantages

- High TSS removal rate: >99.99% (TSS can be treated from 1%wt to < 20mg/L)
- High turbidity removal rate: 1000NTU to <10NTU.
- Low energy consumption, low investment and small footprint.
- Fully automatic operation and low failure rate.
- Low moisture content in mud cake (solid content >70%wt).

Catalytic Desulfurization Wastewater Treatment Project of a Petrochemical

Influent flow rate 15m³/h, TSS (after treatment) ≤30mg/L, and moisture content in mud cake (after treatment) ≤30%wt



👉 Slurry filter - Oslurry

With the proprietary integral metal sintered element, it can filter the particles in liquid efficiently and is widely used for slurry filtration system in refining-petrochemical industry.

Product advantages

- The element has a longer service life.
- Long-term use ensures a lower pressure drop.
- It is more economic.
- It needs a smaller footprint.

Para.	Raw slurry	Design index
Flow rate t/h	18	
Particulate CONC ppmw	200 ~ 1,000	≤20

- ▶ 200,000t/a FGO Filtration Project of a SINOPEC Petrochemical Company
- ▶ Field Installation



Multi-media filter

It has a fiber woven and metal powder sintered porous element, which undergoes gas-solid treatment. It can remove catalyst particles, debris, powder and fluff in waste gas.



▶ HP Syngas Filtration System
▶ HT Sintered Metal Element

Applications

- It can be applied to the thermal catalytic filtration system of CCR/FCC/gasification/IGCC.
- It can be applied to special chemical plants (VCM, BPA, polyurethane, etc.) for filtering sticky particles.
- It can be applied to PE (HDPE), PP and other plants for the purpose of filtration.

Para.	Raw waste gas	Design index
Flow Am ³ /h	200	
Particulate filtration efficiency (filtration accuracy)		99%@1μm

- ▶ HDPE High Density Polyethylene Waste Catalyst Filtration Project of a SINOPEC Petrochemical Company

▶ Bag Filter
▶ Fiber Element



Products

▶ Wireless gateway (cTBox)

👉 Wireless gateway (cTBox)

Wireless gateway (cTBox) adopts the standardized design concept, which is realized in the main module and various expansion modules.

It is the data collection and distribution center of various data acquisition products, with functions for data summary, sorting, calculation of each terminal and communication with the host computer. It provides enough communication interfaces and modes, and can be seamlessly connected with various standardized protocols.



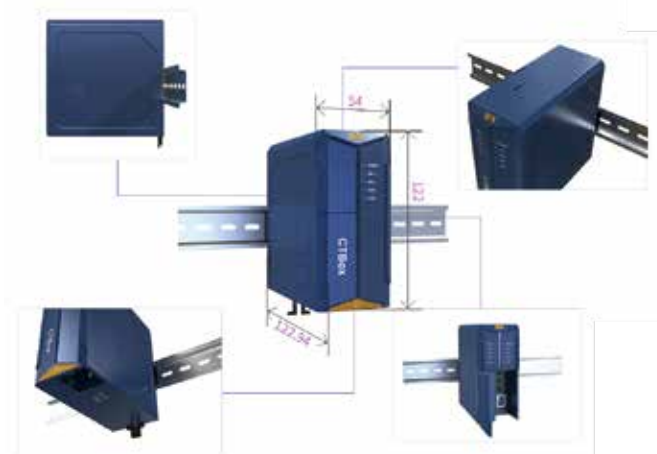
Product advantages

- It has enough communication interfaces and can be connected with a variety of standardized protocols.
- It can meet various needs of users by using different master and slave modules.
- With M.LoRa communication protocol, it is featured by long transmission distance (10KM), low power consumption, no traffic charges, etc.
- It uses standard installation guide rail, which is easy to mount.
- It adopts the multi-data channel, providing a guarantee for timeliness of data to a large extent.
- It is flexibly configured, with parameters sent from the host computer by one click. Data is doubly encrypted and measures are taken for data protection in case of power loss, etc.

Applications

It is applicable to industrial IOT data transmission, edge information collection, environmental data monitoring, agricultural data monitoring, fire safety data monitoring and water conservancy data monitoring.

Product dimensions



Technical parameters

Working voltage	DC 24V
Power supply	PoE and battery powered
Method of communication	M.LoRa wireless communication, 4G, Ethernet and RS-485
Antenna interface	SMA
Communication distance	Open area >10 km
Working temperature	-40 to 80
Working humidity	≤90%RH

Products

▶ RTU

📌 RTU for M.LoRa

It can help change most of the wired products on the market wireless by loading them with modules and fit the various characteristics of wireless products.

With its flexibility, versatility and wide adaptability, MSTN's RTU plays the role of transforming wired instruments into wireless ones in a M.LoRa system. It has various interfaces to accommodate most instruments. For transforming a wired instrument into a wireless one, you just need to connect its signal interface to the RTU to incorporate it in the M.LoRa system, thus achieving intelligent control and wireless features.



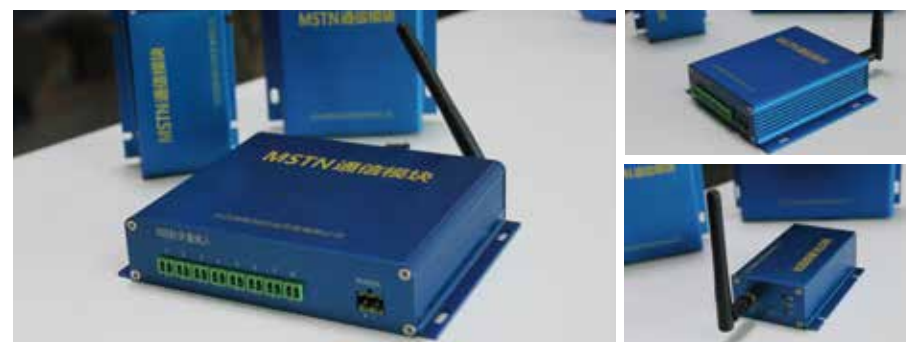
Product advantages

- Easy to install and build
- Various communication interfaces to accommodate most products
- Dual-mode power supply: active and battery
- Various models to adapt to most scenarios
- Low power consumption

📌 AI/DI-LoRa-RTU (unit for analog/digital signal conversion to LoRa)

AI/DI-LoRa-RTU adopts our communication technology M.LoRa. M.LoRa has the characteristics of a LPWAN field technology: long-range, low power consumption and real-time. It is a highly reliable communication method in wireless remote data acquisition solutions.

AI/DI-LoRa-RTU supports integrating analog/digital signals to a unit by wiring and converting these signals to digital signals that can be used for wireless transmission.



Parameters

Working voltage	DC 24V
Power supply	PoE and battery powered
Method of communication	M.LoRa-based wireless communication
Antenna interface	SMA
Communication distance	Open area >10 km
Working temperature	-40°C~80°C
Working humidity	≤90%RH

LoRa-AO/DO-RTU

LoRa-AO/DO-RTU adopts our M.LoRa communication technology. M.LoRa has the characteristics of a LPWAN field technology: long-range, low power consumption and real-time. It is a highly reliable communication method in wireless remote data acquisition solutions.

LoRa-AO/DO-RTU enables you to send the analog/digital signals from the control system to LoRa-AO/DO-RTU through wireless transmission and transmits the analog/digital control information to the corresponding terminal through wiring.



Parameters

Working voltage	DC 24V
Power supply	PoE and battery powered
Method of communication	M.LoRa-based wireless communication
Antenna interface	SMA
Communication distance	Open area >10 km
Working temperature	-40°C~80°C
Working humidity	≤90%RH

M.POW_E/L (smart posts for pipe network)

There are three categories of posts used in long-distance pipeline projects: mileage posts, horizontal corner posts and marker posts. To make complete and clear identification of pipelines, facilitate management, prevent vandalism and meet standardization requirements, it is necessary to set up three categories of posts plug signs for long-distance pipelines, and the posts are mileage posts/cathodic protection test stations, marker posts (corner posts) and additional posts.

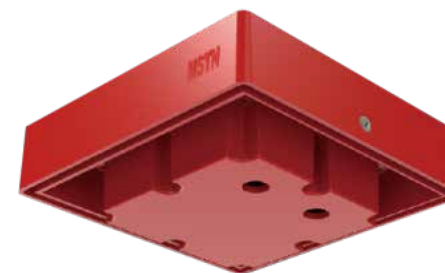
The traditional "three categories of posts" consume a lot of manpower of the owner enterprises for inspection and maintenance; post damage, displacement or loss cannot be identified timely; inspectors need to collect cathodic protection test data on site, making it difficult to the loss of protection in a timely manner. Therefore, there are risks in maintaining the pipeline intact.

Product advantages

- Real-time sensing (real-time sensing and reporting of the state of the post)
- Visualization (comprehensive display of post data through statistical analysis of data on the monitoring computer)
- Data collection
- Function integration
- Reduced operation cost

Applications

- Long-distance pipelines
- urban pipeline network
- electric power pipeline network
- water conservancy pipeline network
- oil and gas pipeline network



Products

► M.PsnCD (positioning card)

✦ M.PsnCD (positioning card)

M.PsnCD involves three main technologies: Bluetooth positioning, BeiDou/GPS positioning and UWB positioning.

▼ Bluetooth positioning

Bluetooth positioning is mainly used for indoor and outdoor scenarios that do not require high accuracy and have certain obstruction.

Features

- ▶ easy to build and convenient, low cost and low power consumption.

▼ BeiDou/GPS positioning

BeiDou/GPS positioning is mainly used for outdoor positioning scenarios in open locations without obstruction.

Features

- ▶ less infrastructure, low cost, high applicability and wide range of applications.

▼ UWB positioning

UWB positioning is mainly used for high-precision positioning scenarios.

Features

- ▶ high positioning accuracy and quick response

Product advantages

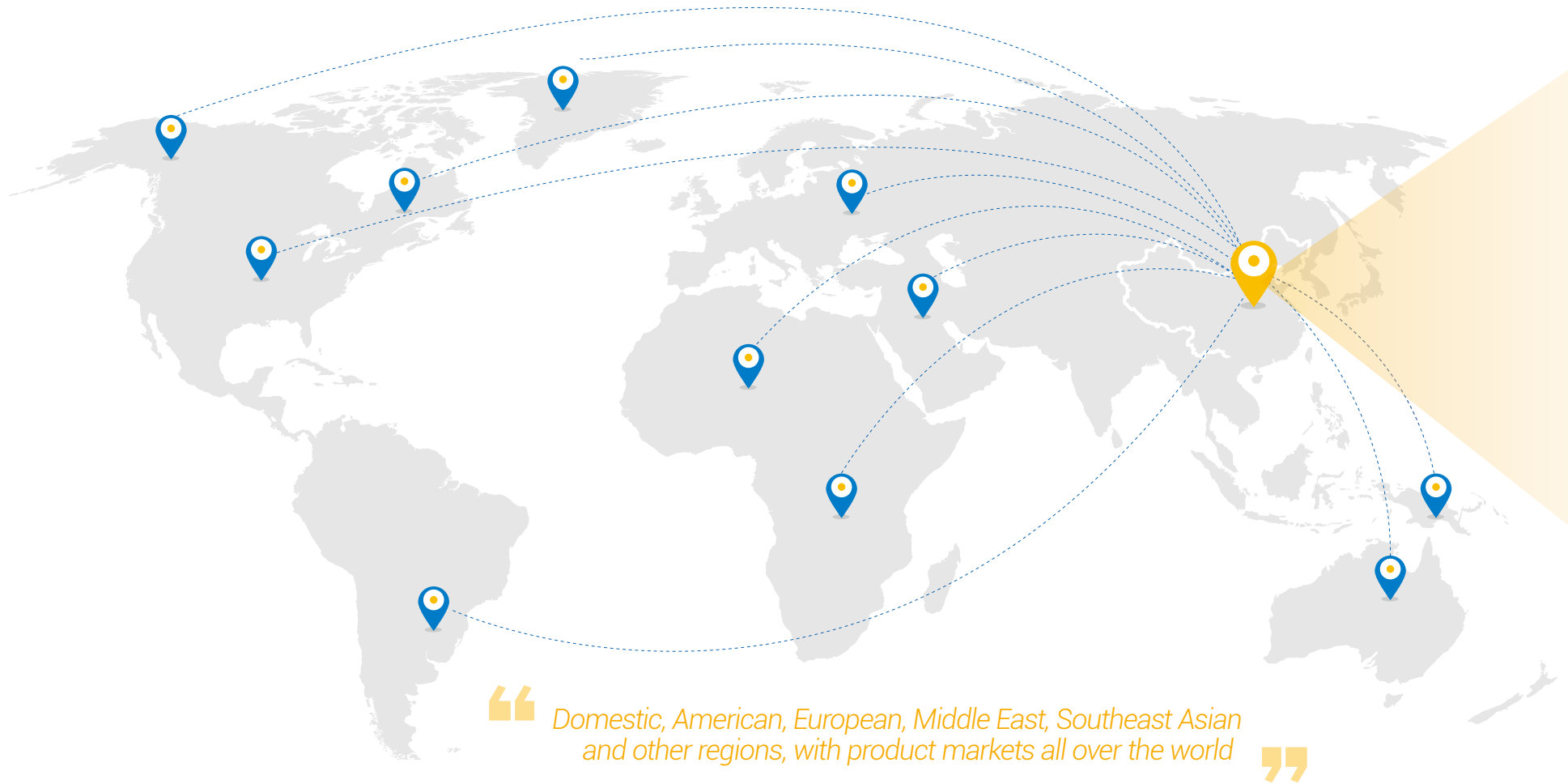
- Private network architecture, instead of the original positioning system with high traffic consumption
- Low construction cost and high maintainability
- Highly upgradeable, with a variety of positioning upgrade modes reserved to meet higher accuracy positioning needs in the future
- Low power consumption, with the endurance of Bluetooth beacons being 3 years or longer
- Automatic switch between positioning places

Applications

- Positioning-based safety management of plant staff
- personnel in workplace
- special groups of people.



▶ Performance Distribution





► Main Partners



An aerial photograph of a large industrial facility, likely a refinery or chemical plant, captured at dusk or night. The scene is filled with numerous tall smokestacks, some emitting plumes of white steam or smoke. The ground is a complex network of pipes, walkways, and large cylindrical storage tanks. The entire facility is illuminated by a dense array of lights, creating a bright, glowing effect against the dark blue twilight sky. In the foreground, there are some green trees and a few buildings, including one with a prominent blue roof. A semi-transparent yellow banner is overlaid across the middle of the image, containing the text "Enthusiasm · Innovation · Service · Espect · Responsibility".

Enthusiasm · Innovation · Service · Espect · Responsibility



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