

# To be the World's Leading Expert in Mine Ventilation and Environmental Protection



Zibo Decent Machinery Co., Ltd.



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Introduction of  
Decent Machinery

## PART 02

Product Technology  
and Service



鼎威机械  
DECENT MACHINERY

01

PART

# Introduction of Decent Machinery

鼎威机械  
DECENT MACHINERY

## // Company Profile



Zibo Decent Machinery Co.,Ltd engaged in Ventilation and Dedusting Industry. Mainly integrate supply chain resources to provide customers with full solutions and one-stop services.

By 2022, we have provided ventilation and dust removal solutions for customers in at least 120 countries. Save them a lot of time and energy, and use high-performance products to win more profits for customers. Based on 40 years of production experience and 20 years of export experience, we have organized a professional technical team and hired excellent Serbian engineer 3. Mr. Branislav Mihajlovic as our special consultant. At the same time, we also attach great importance to after-sales service. We have established after-sales service centers in Canada, Singapore, Thailand, Vietnam, Indonesia, Ghana, Panama, Peru, Serbia and other places to bring more convenient after-sales service experience to more customers. .



鼎威机械  
DECENT MACHINERY

# Honors and Achievements



## Company Honors

## Product achievements





# Core Patented Technology



鼎威机械  
DECENT MACHINERY



99 patents and soft works,  
including 18 invention  
patents, 73 utility models  
and 8 soft works

# 02 Product Technology and Service

PART

鼎威机械  
DECENT MACHINERY



# Mine Ventilation Monitoring and Intelligent Control System ("131" System for Short)

Special Project of National Development and Reform Commission on "Research on Major Key Technologies for Comprehensive Treatment and Utilization of Coal Mine Gas"

## System features:

modular unit

Personality combination

Real time monitoring

intelligent control

## System functions:

Real time early warning

Man machine dual control

Air supply on demand

Disaster prevention and mitigation

## System effect:

Safe wind

Clean wind

Economic wind

## System value:

Customers are relieved

Miners save trouble

Enterprises save money

## 1 Information Collection System

- ◆ Mine ventilation information acquisition system



## 3 Executive Systems

- ◆ Centralized control system of mine local ventilation (including complete set of intelligent local ventilation equipment)
- ◆ On-line monitoring and fault diagnosis system for main mine fans
- ◆ Remote air flow dispatching and control system in main air control areas of mine



## 1 Decision System

- ◆ Analysis and decision system of mine ventilation





# // Core Technology Field

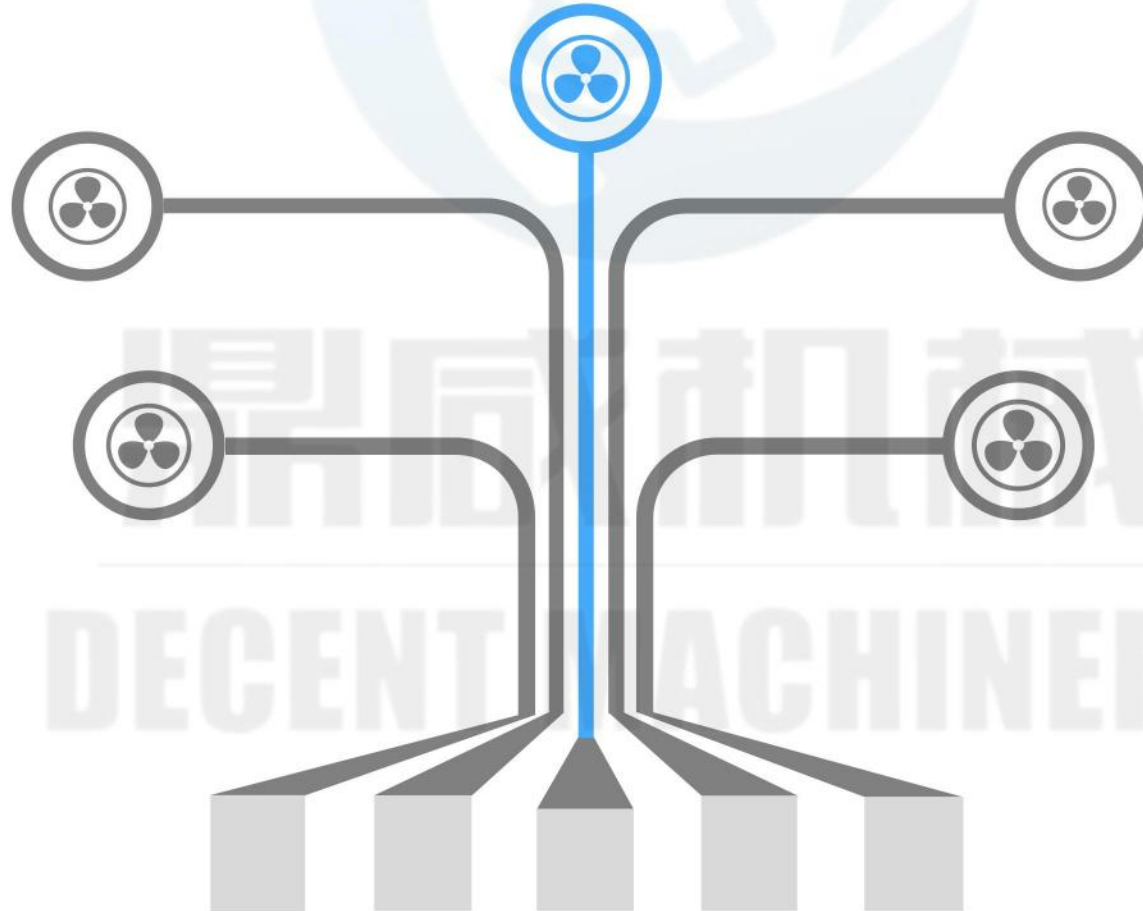


## Fan Field

The Technology of Curved Swept  
Combined Orthogonal Three  
Dimensional Twisted Blade  
B-spline stacking blade technology  
Primary regulation technology outside  
blade machine  
Integrated technology of fan structure  
Panel type noise elimination technology  
Radial Annular Noise Reduction  
Technology  
Fan load characteristic technology  
Fan specific motor technology  
Converter runner type heat dissipation  
technology  
Spectrum pre diagnosis technology for  
bearing faults

## Fan Monitoring and Control Field

Frequency conversion control technology Integrated control technology Remote centralized control technology of intelligent ventilation in the whole mine Switch automatic control technology  
Centralized monitoring technology of local ventilation Unattended technology Online monitoring and fault diagnosis technology



## Ventilation Field

Network solution technology  
Auxiliary decision-making technology for ventilation optimization  
Real-time monitoring and emergency control decision-making technology of mine ventilation system  
Fast calculation technology of whole air network of mine ventilation system based on limited roadway ventilation monitoring  
Automatic damper and window technology

## Dust Removal Field

Dust removal technology with horizontal turbulent ball filler for mining  
Horizontal multi-stage filtering wet resonant chord grid dedusting technology  
Wet grid plate filtering dedusting and desulfurization technology for vertical air outlet of air shaft  
Inertia gravity dust removal technology for main fan outlet



# // Main Products and Services Formed

## Main Fan



## Local Fan



## System



### 1、 Fan Series Products

Main fan, ultra-low noise local fan, non coal mine fan, special motor for local fan, automatic air door and window, etc.

### 2、 Power Distribution, Monitoring and Control System

High and low voltage power distribution system, intelligent switch and flow channel inverter for fans; Online monitoring and fault diagnosis system, unattended fan and non-stop fan switching system; Intelligent local ventilation complete equipment, local ventilator centralized control system, local area intelligent ventilation control system, mine intelligent remote centralized ventilation control system, local ventilation automatic control system, mine three-dimensional ventilation auxiliary decision-making system, automatic door and window remote control system.

# // Main Products and Services Formed

## Remove Dust



### 3、Dedusting Series Products

Underground wet deduster, dry deduster, wet grid plate filtering dedusting system, inertial gravity dedusting device of main fan.

### 4、Scheme Design and Ventilation Service

Mine ventilation scheme design, specialized ventilation service and general contracting operation service of butler ventilation.

### 5、Project

Mine dust removal, mine desulfurization and denitrification air treatment, mine sewage treatment, mine filling, mine ecological restoration, etc.

## Engineering



## Software Platform



## // Product Service Cases



### Longest Life

Huaibei Mining Bureau - local ventilator has been working for 15 years



### Highest Altitude

China Gold Group - the main fan is used in the Qinghai Tibet Plateau, with an altitude of 4600 meters



### Longest Ventilation

Daban Tunnel in Yili, Xinjiang -- the air supply distance of the three-stage counter rotating local fan is up to 15km



### The Lowest Temperature

Yinchuan Zhongbo main fan is used in Siberia, Russia, with the minimum temperature of minus 70 °C



### The Most Complete Equipment

Shanxi Fenxi Taiyue Coal Industry -- including the whole system of fan, electric control, online monitoring, unattended, remote monitoring and non-stop fan switching



### The Most Comprehensive Service

NFC Africa Mining Co., Ltd. - designed the ventilation scheme of the whole mine, and provided "butler type" services for all ventilation related equipment and general contracting of ventilation operation

# // Composition of Intelligent Ventilation System

## System Composition



01

### Composition of Ground Centralized Control System

Dispatching room, control room, etc

02

### Centralized Control Composition of Main Fans

Remote start/stop, switching, fault, alarm, etc

03

### Centralized Control Composition of Local Ventilator

Remote start/stop, experiment, fault alarm, etc

04

### Automatic Ventilation Structure

Air door, air window, sealing wall, etc

05

### Data Acquisition and Communication

Sensors, video, communication equipment, etc

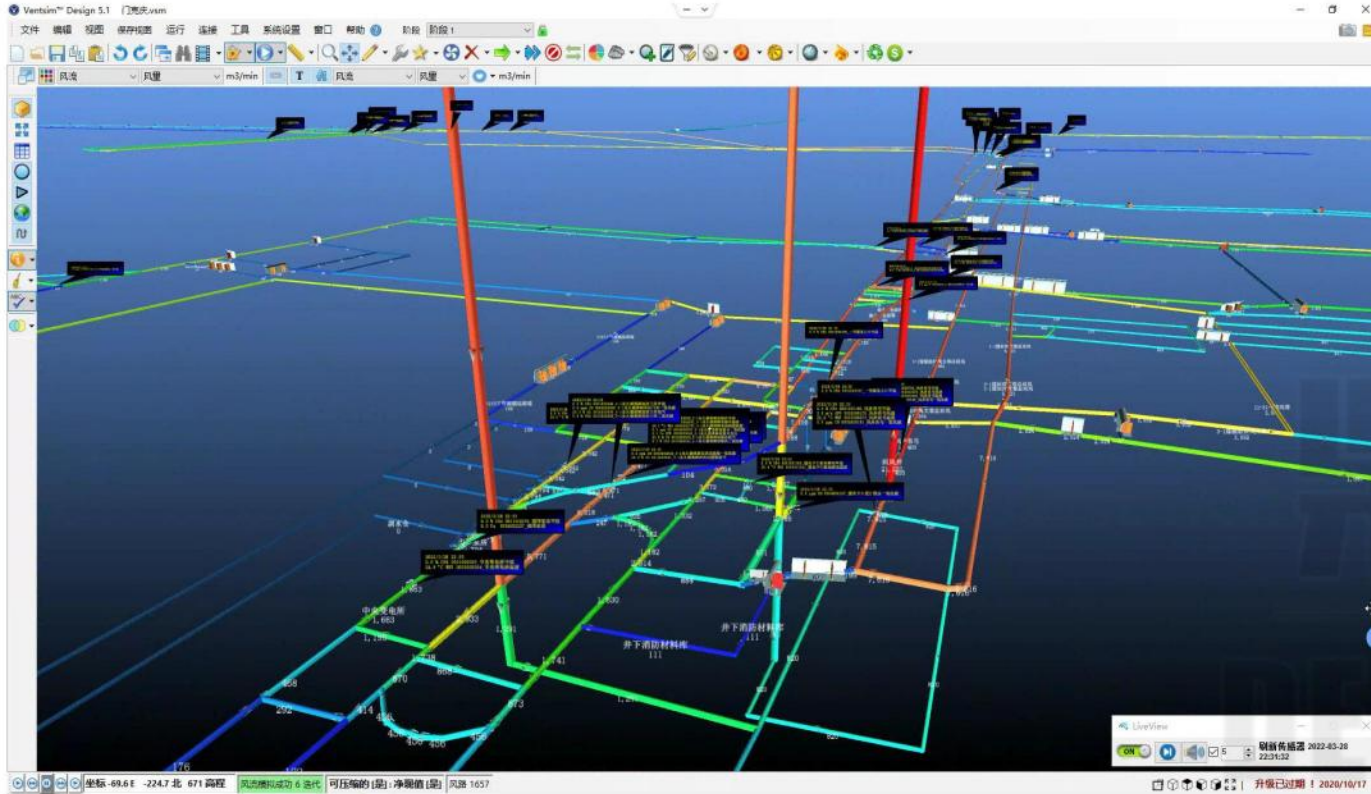
06

### Big Data Platform

Whole mine air regulation, diagnostic alarm, etc

# // Functions of Intelligent Ventilation System

## System Function



01

### Functions of Centralized Control Software

Ground centralized control system

02

### Sub Module Function

Main fan, local fan, air door, air window, airtight

03

### Ventilation Regulation Function

Ventilation regulation of working face and mining area

04

### Reserved Function

Reserved functions for intelligent ventilation development

# Intelligent Remote Centralized Control System for Ventilation



The intelligent remote centralized management and control system of mine ventilation has realized the transformation of mine ventilation from "extensive management" to "accurate management", from "labor-intensive" to "technological innovation", from "hindsight" to "prediction and prevention", and from "equipment management" to "intelligent management", thus realizing the safe, efficient and economic production of the mine.

Mine intelligent ventilation is conducive to improving the efficiency of ventilation management, achieving accurate air volume measurement, remote control of ventilation equipment, unattended and fault diagnosis of ventilation subsystems, etc. It can also extend to the research on the correlation technology between mine ventilation and mine safety.

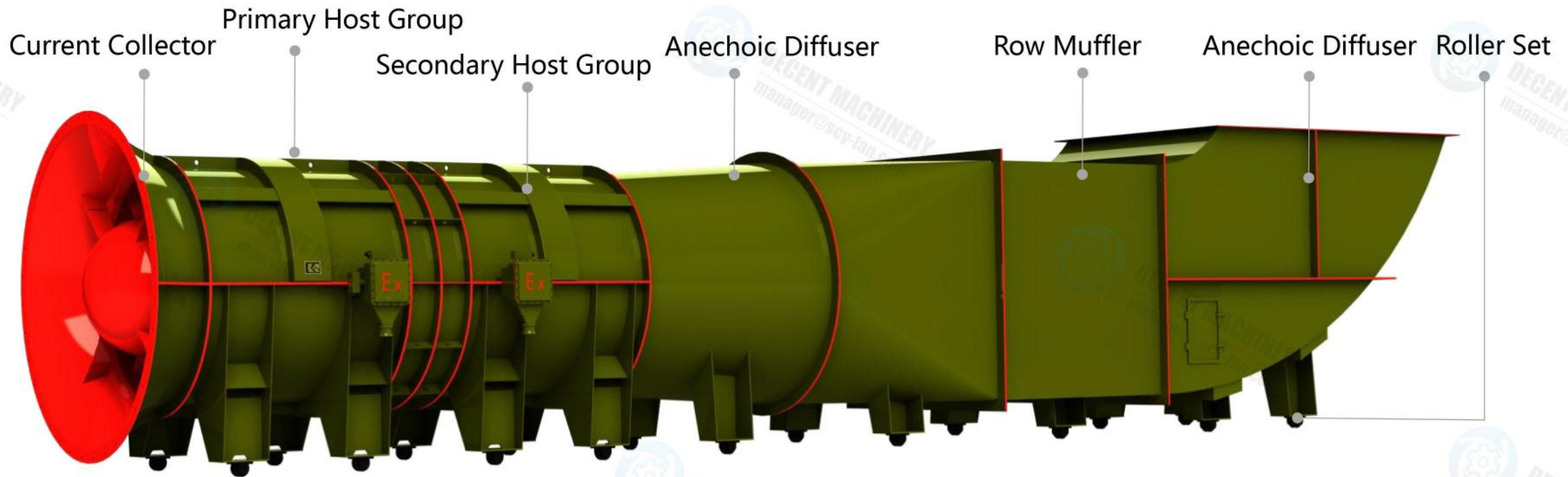
Building mine intelligent ventilation system is to implement the requirements of intelligent mine construction, improve the level of mine ventilation safety management, realize the dynamic display, remote control and real-time analysis of mine three-dimensional ventilation system, achieve the purpose of air supply on demand, and reduce the operating cost of mine ventilation system.



Zhongtian Hechuang Mengkeqing Coal Mine  
Intelligent remote Centralized Control System For  
Ventilation



## /// Mine Main Fan - Structure



FBCDZ series of mining extraction counter rotating axial flow main fan is a new type of high efficiency and energy saving main fan specially used in mines, which is independently developed, designed and manufactured by our company in combination with the ventilation network parameters of large and medium-sized mines. This fan is suitable for ground extraction ventilation.

The standard configuration of the main fan is composed of a collector, a primary host group, a secondary host group, an anechoic diffuser, an anechoic diffuser, and a trailer group; The configuration can be increased as required. The ventilator can be composed of embedded joint (optional), collector, butterfly valve, test air duct, butterfly valve joint, primary host group, secondary host group, muffler diffuser, row type muffler (optional), muffler diffuser, muffler booster (optional), etc.



# // Mine Main Ventilator - Optional Device

According to the function and use and maintenance requirements, the following options are available:

Dedusting: gravity dedusting device

Overhaul: electric traveling device

Shutdown: electric braking device

Oil filling: automatic oil filling device

Anti freezing: drainage and anti freezing device

### Electric Braking Device



### Drainage and Antifreeze Device



### Gravity Dust Removal Device



### Electric Traveling Device



### Automatic Oiling Device



## // Mine Main Fan - Impeller

The blade is made of low pressure casting and 2A50 aluminum alloy forging process. Anodic passivation treatment of blade surface increases wear resistance and corrosion resistance of blade. The hub is annealed as a whole to remove internal stress, reduce deformation, and ensure machining accuracy and dynamic balance.

Impeller angle adjustment mode: static internal blade by blade adjustment, static external blade by blade adjustment, static external overall adjustment.

In addition, the explosive welding process of copper steel composite plate of cylinder ring can be used for trial production, and the supersonic spraying process of cobalt chromium tungsten carbide for aluminum blades can be used.



Forged Aluminum Blade



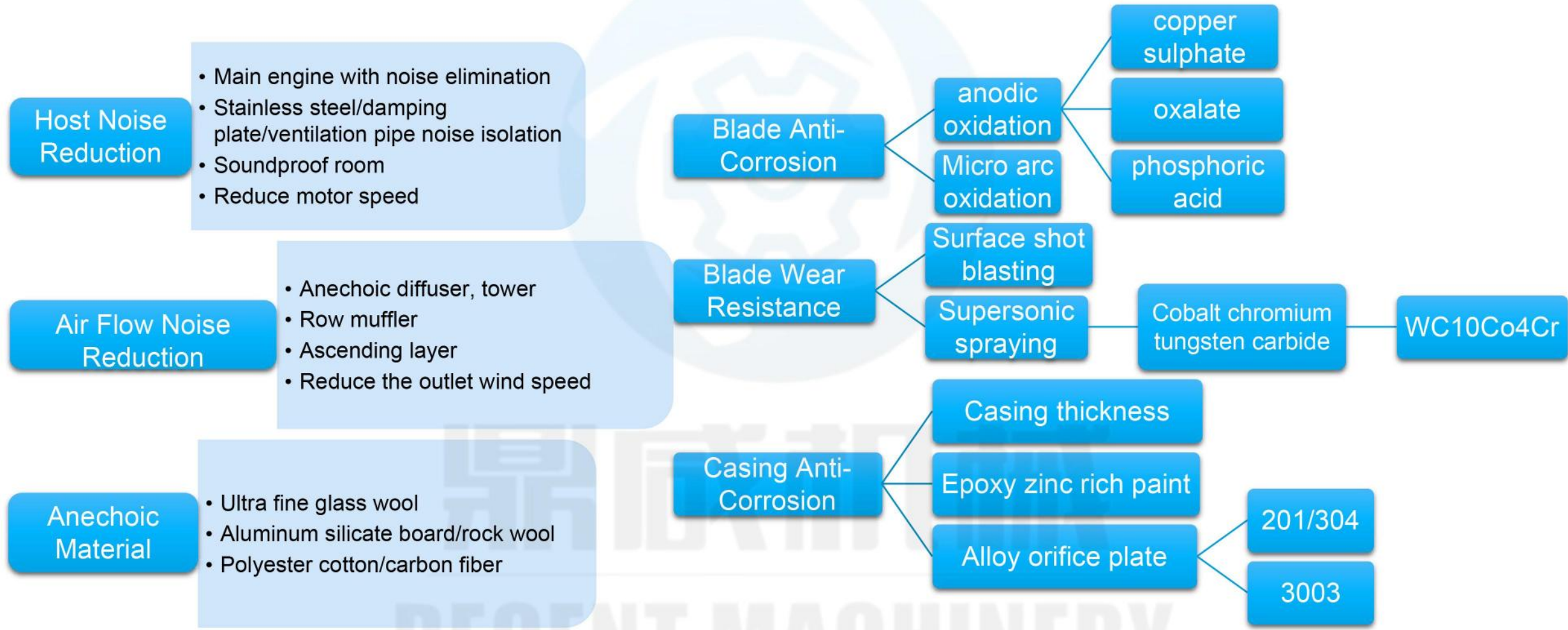
Low Pressure Casting



Explosive Welding Barrel Ring

Casting Process	Texture of Material	Processing Method	Main Performance
Low pressure casting	ZL104 aluminum alloy	CNC machining+surface polishing	tensile strength $\sigma_b \geq 230\text{MPa}$
forging	2A50 forged aluminum	Dimension and surface machining center finishing+polishing+anode passivation	tensile strength $\sigma_b \geq 355\text{MPa}$

# // Mine Main Fan - Noise Reduction and Anti-Corrosion



Noise Reduction Measures

Corrosion Prevention

# // High and Low Voltage Distribution System

## KYN-28 High Voltage Distribution System

6kV/10kV, frequency conversion and soft start can be configured



## GDDLV Distribution System

380/660V, frequency conversion, soft start and auto voltage reduction can be configured

# // High and Low Voltage Distribution System

2002

## Low Voltage Electric Control

In 2002, the first set of low-voltage electric control system was established. In 2003, it was the first time to use frequency converter to start the main fan, and it is also the earliest company to use domestic frequency converter in the fan industry. Over the years, we have accumulated a lot of experience in the design, use and maintenance of frequency converters. More than 20 brands are used, including ABB, Siemens and Schneider. Domestic brands, such as Aviton, Hekang, Senlan, Huichuan, Weichuang, etc. There are corresponding designs for different brands when they are used in different environments, such as high altitude, accurate measurement, on-site harmonic interference, common grounding of grounding system, etc.

2015

## High Voltage Electric Control

In 2015, the first set of high-voltage electric control was produced independently. Specially designed and manufactured for main ventilator to ensure safety and reliability. After being put into operation, there is no fault. Based on the use experience of frequency converter, components are selected for fan control, and frequency converter protection is selected. For example, transformer protection unit is selected for microcomputer comprehensive protection, and high-voltage outlet cabinet enters the frequency converter and moves to the transformer, which is different from the motor protection unit of other manufacturers, and more effective protection for frequency converter and motor.



# // Online Monitoring and Fault Diagnosis System

## System Functions:

It has eight functions, including data and status monitoring, remote control, unattended, non-stop fan switching, fault diagnosis, information query, data and report management, and data remote transmission.

## System Advantages:

1. High integration function and high precision monitoring: measure and display the electrical parameters of the motor locally, with current and voltage accuracy of 0.3% and other accuracy of 0.5%;
2. Anti interference processing design of analog quantity;
3. Modular design;
4. Redundant in power supply design;
5. The software system is self-developed, with powerful functions and can be upgraded iteratively.
6. The differential pressure method is used to calculate the air volume, negative pressure, wind speed and total pressure. The wind speed sensor is not required, and the data is accurate and stable;
7. Intelligent control: the output frequency of the frequency converter is controlled by PLC to adjust the speed of the motor and keep the air supply pressure constant; Automatic detection of temperature and vibration displacement signals.
8. Intelligent fault diagnosis: make statistics and simulate system faults, establish an intelligent database, and realize comprehensive pre diagnosis of blade distortion, motor vibration, motor temperature, voltage and current anomalies, etc. through system self diagnosis, as well as remote expert diagnosis system.







# Software Interface of Online Monitoring and Fault Diagnosis System

### 主通风机在线监控与故障诊断系统

2022年3月5日 星期日 13:04:56 秒六

用户登录 用户管理 用户注销 退出系统 重启电脑 工作模式 自动模式 报警解除 1#风机运行

#### 自动化控制功能设置

1#风机调速	1#风机调速
2#风机调速	2#风机调速
1#风机一级调速	1#风机二级调速
1#风机一级调速	1#风机二级调速
1#风机一级调速	1#风机二级调速
1#风机一级调速	1#风机二级调速
1#风机一级调速	1#风机二级调速
1#风机一级调速	1#风机二级调速
1#风机一级调速	1#风机二级调速

2#风机运行

2022-03-05 13:04:56 秒六

登录状态: 未登录

2# 1#

### 主通风机在线监控与故障诊断系统

2022年3月5日 星期日 13:04:56 秒六

用户登录 用户管理 用户注销 退出系统 重启电脑 工作模式 自动模式 报警解除 1#风机运行

#### 主通风机6KV高压电气控制系统

2#风机运行

2022-03-05 13:04:56 秒六

登录状态: 未登录

2# 1#

### 主通风机在线监控与故障诊断系统

2022年3月5日 星期日 13:04:56 秒六

用户登录 用户管理 用户注销 退出系统 重启电脑 工作模式 自动模式 报警解除 1#风机运行

#### 主通风机变频器控制界面

1#风机一级变频器	1#风机二级变频器	2#风机一级变频器	2#风机二级变频器
<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p> <p>频率给定 Hz: 7777777</p> <p>频率反馈 Hz: 7777777</p> <p>速度反馈 Hz: 7777777</p> <p>速度反馈 Hz: 7777777</p>	<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p> <p>频率给定 Hz: 7777777</p> <p>频率反馈 Hz: 7777777</p> <p>速度反馈 Hz: 7777777</p> <p>速度反馈 Hz: 7777777</p>	<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p> <p>频率给定 Hz: 7777777</p> <p>频率反馈 Hz: 7777777</p> <p>速度反馈 Hz: 7777777</p> <p>速度反馈 Hz: 7777777</p>	<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p> <p>频率给定 Hz: 7777777</p> <p>频率反馈 Hz: 7777777</p> <p>速度反馈 Hz: 7777777</p> <p>速度反馈 Hz: 7777777</p>

2#风机运行

2022-03-05 13:04:56 秒六

登录状态: 未登录

2# 1#

### 主通风机在线监控与故障诊断系统

2022年3月5日 星期日 13:04:56 秒六

用户登录 用户管理 用户注销 退出系统 重启电脑 工作模式 自动模式 报警解除 1#风机运行

#### 主通风机风门、低压柜控制

1#垂直百叶窗风门	1#水平百叶窗风门	1#柜压进线柜
<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p>	<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p>	<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p>
2#垂直百叶窗风门	2#水平百叶窗风门	2#柜压进线柜
<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p>	<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p>	<p>运行频率 Hz: 7777777</p> <p>运行电流 A: 7777777</p>

2#风机运行

2022-03-05 13:04:56 秒六

登录状态: 未登录

2# 1#



# // Non-Stop Fan Reversing System

Equipment Safety -  
Cannot Be Guaranteed

01

Reversal Process -  
Short Air Stop

03

02

Switching Time -  
10 Minutes

**Traditional Method -  
Stop and Reverse**

鼎威机械  
DECENT MACHINERY

# // Non-Stop Fan Reversing System



Online Monitoring System for JKZ-5 and Above Main Fans

Shutter System for Non-Stop Fan Reversing

The non-stop fan reversing damper system is composed of vertical grid mounted damper, horizontal air damper and maintenance damper (determined according to the site needs). The vertical grid mounted damper and horizontal air damper shall be shutter type damper, and the maintenance damper can be electric vertical damper or side opening slide plate damper.



# Non-Stop Fan Reversing System

## Service Damper

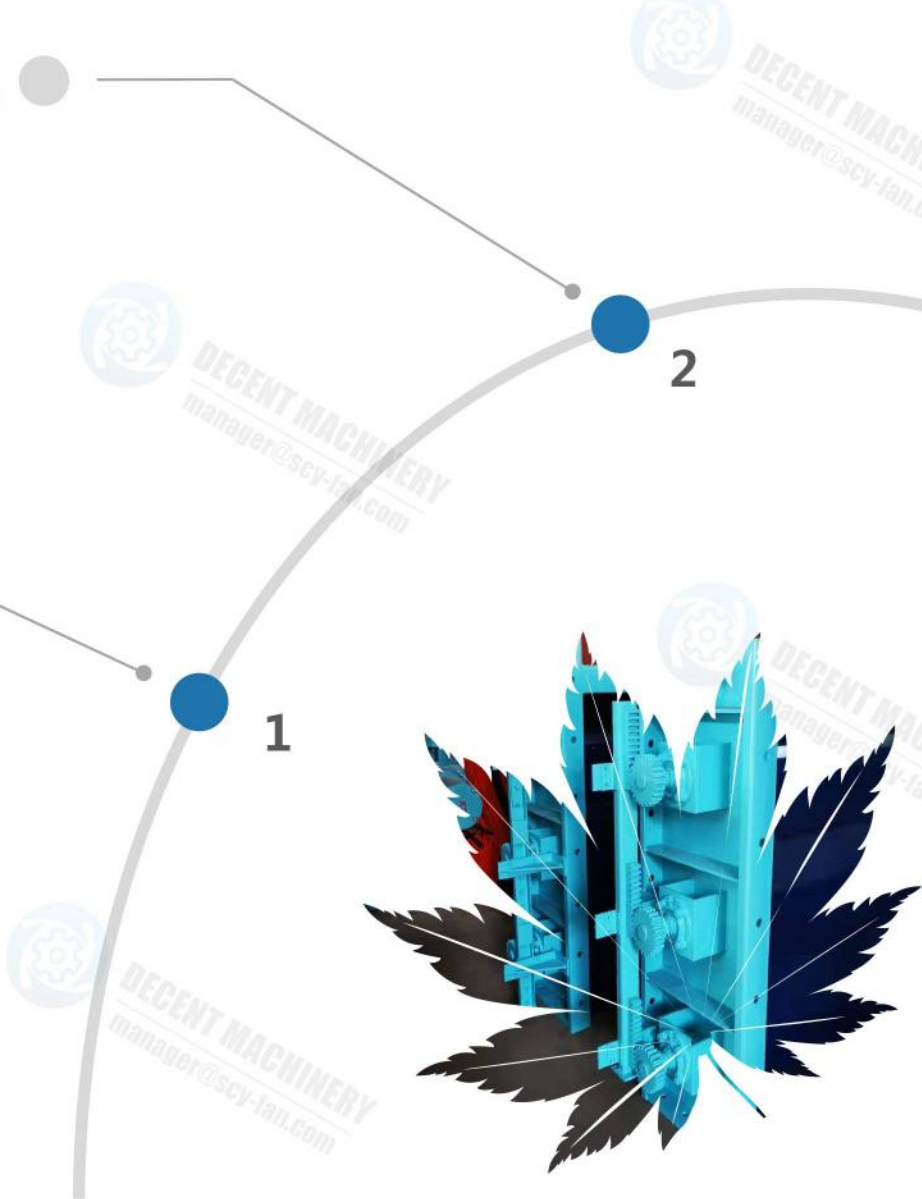


The electric vertical damper or side opening slide plate damper shall be adopted. The maintenance damper does not participate in the process of non-stop fan reversing. It only closes when the main fan or other dampers need maintenance. It is normally open during the normal operation of the main fan system.

## Louver Damper



- 1.It is composed of blade, door frame and actuator. The actuator can be driven by hydraulic pressure or motor. The motor drive has high precision and stable system. There are two opening modes: electric and manual.
- 2.Diamond 316L stainless steel blade.
- 3.Use special B and P sealing materials. Corrosion resistance, low temperature and good sealing performance.
- 4.The rack drive is simple in structure and convenient for angle adjustment, maintenance and replacement.



# // Non-Stop Fan Reversing System

## Features of Non-Stop Fan Reversing System

### Hot Standby Machine

In the traditional "shutdown and switching" process of the main fan, once the standby fan cannot be started as expected due to accident, the mine ventilation will be difficult to recover in a short time, resulting in ventilation instability, or even accidents. The non-stop fan switching system realizes the early detection, maintenance and startup of the standby fan. The transition of the fan from cold standby to hot standby further improves the success rate and safety of the switching.



### Keep the Wind Running

The action of damper and electric control is synchronized during the hot standby of the main fan, so as to realize the fast switching of the main fan and shorten the "system air stop" to "air volume fluctuation" during the switching process.

### Fast Switching

Complete the machine switching in 40 seconds.



# Overview of Ultra-Low Noise Intelligent Local Ventilation Equipment



Ultra low noise new intelligent local ventilation complete equipment is the third generation of intelligent local ventilation complete equipment of our company. It has undertaken the national "Tenth Five Year Plan" scientific and technological breakthrough project and won the top ten new science and technology promotion projects in the coal industry. During the system development, 8 invention patents, 24 utility model patents and 2 software copyrights were obtained.

All configuration products have patent rights, and the software system has copyright, and all patents are in use.

The intelligent local ventilation complete equipment adopts a control system composed of PLC and frequency converter, which takes gas, carbon monoxide, wind speed, blast smoke, dust, etc. as the main parameters to adjust the fan speed, so as to achieve on-demand air supply, safe ventilation, and achieve the purpose of energy saving, and solve the ventilation problem of the mine shaft roadway or mining face. With the goal of "safety, reliability, energy conservation and environmental protection" and the characteristics of "module unit, personality combination, real-time monitoring and intelligent control", the equipment has achieved the effect of "real-time early warning, human-machine dual control, on-demand air supply, disaster prevention and mitigation", filled the gap in the field of intelligent control of local mine ventilation in China, and reached the domestic leading level.

# Composition of Intelligent Local Ventilation Remote Centralized Control System

Smart Switch      Runner Type Frequency Converter      Counter Rotating Local Fan      Centralized Control Configuration      Changer      Ground Terminal



**Ventilation:** local ventilator, frequency converter, intelligent switch, dual fans, dual power supply, dual frequency conversion configuration, and anti gas countercurrent device (used in high gas mines to prevent gas from entering the suction section of the fan);

**Acquisition:** controller, branching device, uninterruptible power supply (if the switch meets the multi-sensor acquisition function, it can be reduced);

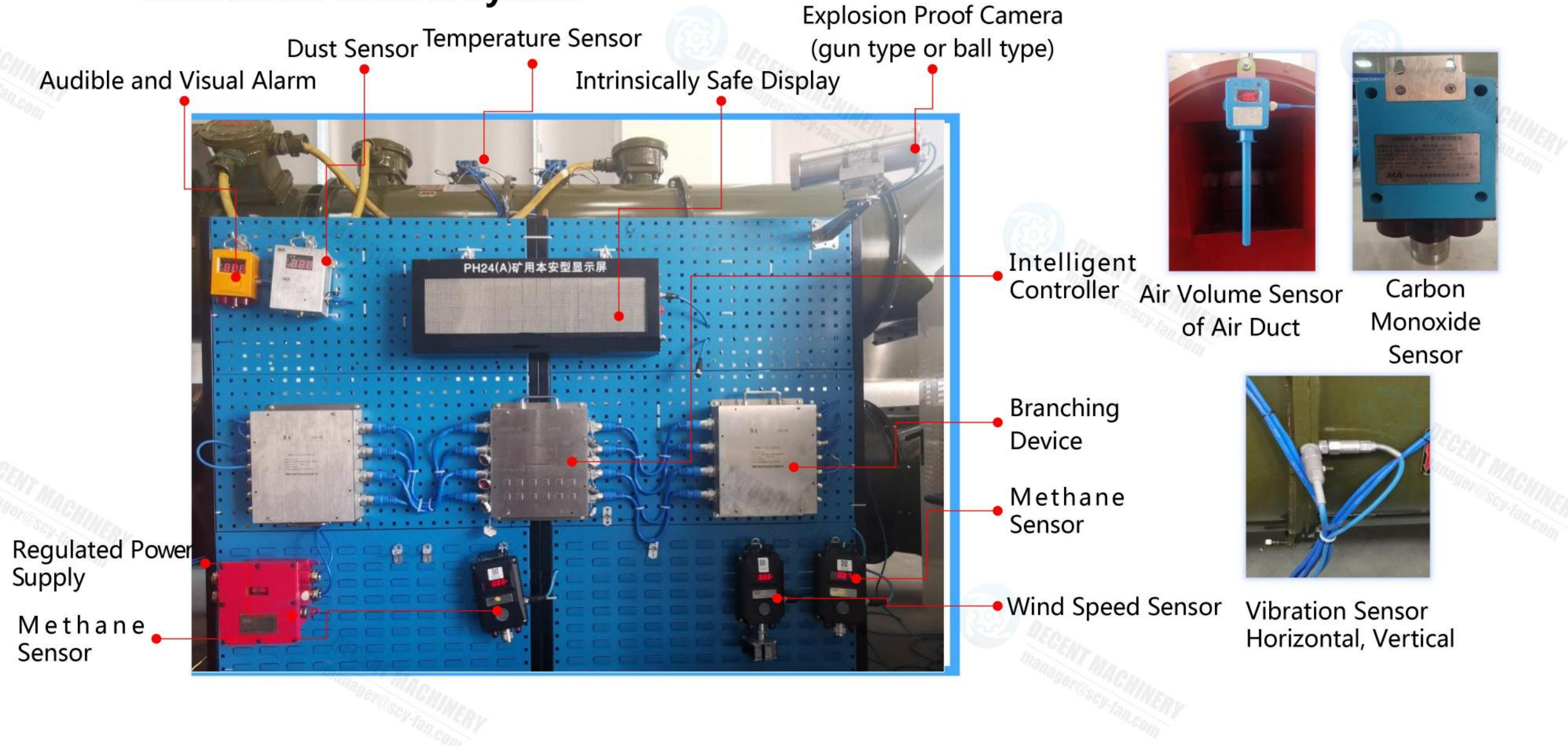
**Data:** alarm parameters: current, temperature, vibration; Control parameters: gas, wind speed (air volume of air duct), driving distance; Environmental Parameters: carbon monoxide, dust (ventilation and dust removal system, dust is the control parameter, and Shandong ventilation and dust removal system is the configuration).

**Network:** switch, photoelectric conversion module.

**Cables and auxiliary materials:** power cables, communication cables, optical fibers, network cables, etc.

**Platform:** upper computer centralized control platform or WEB remote centralized control platform.

# Composition of Intelligent Local Ventilation Remote Centralized Control System



Audible and Visual Alarm

Dust Sensor

Temperature Sensor

Intrinsically Safe Display

Explosion Proof Camera  
(gun type or ball type)



Intelligent Controller

Air Volume Sensor of Air Duct

Carbon Monoxide Sensor

Branching Device

Methane Sensor



Wind Speed Sensor

Vibration Sensor Horizontal, Vertical

Regulated Power Supply

Methane Sensor

# // Main Functions of Intelligent Local Ventilation Remote Centralized Control System

## Collection of Equipment Operation Parameters

Collect equipment operating parameters, current, voltage, air volume, air pressure, temperature, vibration, etc

## Wind Power Lockout, Gas Power Lockout

Wind power lockout and gas power lockout are realized according to the environmental monitoring results

## Remote Operation and Frequency Conversion Regulation

Remote one button start stop, one button switch, and realize manual or variable frequency regulation of air volume according to wind speed, gas, dust and other parameters



## Sensor Parameter Acquisition

Collect gas, wind speed, carbon monoxide, dust and other parameters through sensors

## Automatic Switch Between Active and Standby

Realize automatic switching of main and standby fans






## Remote Centralized Control

Centralized data display, remote operation, archiving, query and other functions of single or multiple sets of equipment are realized through the ground centralized management and control software platform (upper computer or WEB large system platform)



# Ultra Low Noise Integrated Local Fan

Noise Reduction Measures Integrating Methods, Structures and Materials

-  Sound absorption and sound insulation+damping vibration and noise reduction
-  Integrated+panel muffler structure
-  Split radial annular noise elimination structure
-  Silencing structure of fan
-  Imported silent bearing+new environment-friendly noise reduction material



报告编号: FJC20206438-GJZJ

## 测试报告

产品名称 矿用隔爆型压入式对旋轴流局部通风机  
 型号规格 FBDYNo7.1/2×45 (660/1140V)  
 委托单位 淄博鼎威有限公司

国家煤矿防尘通风安全产品质量监督检验中心

国家煤矿防尘通风安全产品质量监督检验中心

## 测试报告

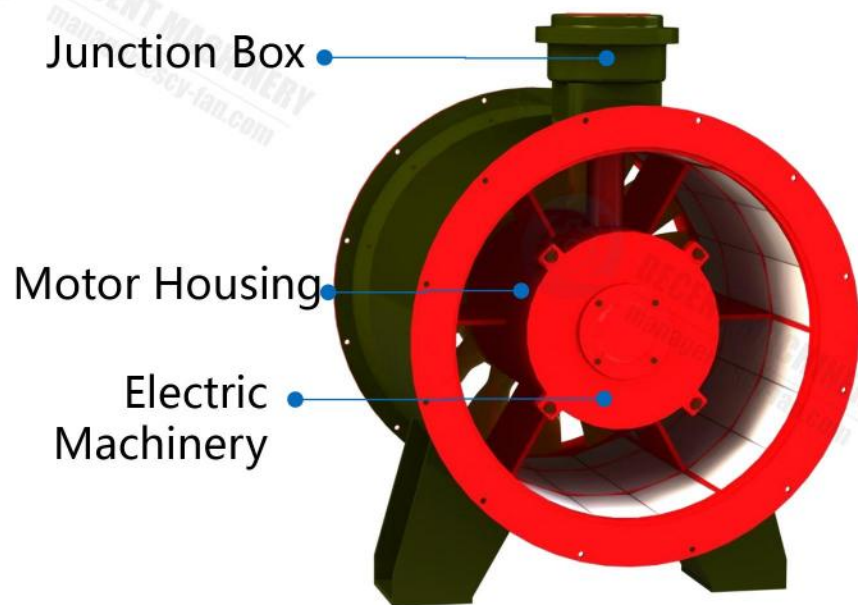
№: FJC20206438-GJZJ 第 3 页 共 4 页

### 测试结果

序号	测试项目	测试结果		备注
1	噪声	进口噪声(dB) A	78.1	最大风量点
		进口比 A 声级(dB)	13.7	
		机壳辐射噪声(dB)A	77.7	
		进口噪声(dB) A	79.7	最高全压效率点
		进口比 A 声级(dB)	-1.3	
		机壳辐射噪声(dB)A	79.1	



# Quality Measures for Ultra Low Noise Integrated Local Fan



## Integrated Structure:

The motor base and the fan housing are welded together. It is the first in China to rewrite the standard.

### 1. Integrated Structure Advantages:

Welding integration: the fan has better strength and more stable operation.

Machining: the concentricity shall be strictly ensured, and the assembly accuracy shall be ensured by machining, with better stability.

Smooth flow passage: the diameters of the motor casing, impeller hub and muffler core barrel are consistent, and the motor radiator is canceled to ensure the smooth flow passage to the greatest extent.

Lower temperature rise: use the large flow of fan to dissipate heat for the motor, with lower temperature rise and better reliability.

### 2. Balance Advantages:

The impeller adopts numerical control machining, with good precision and small balance.

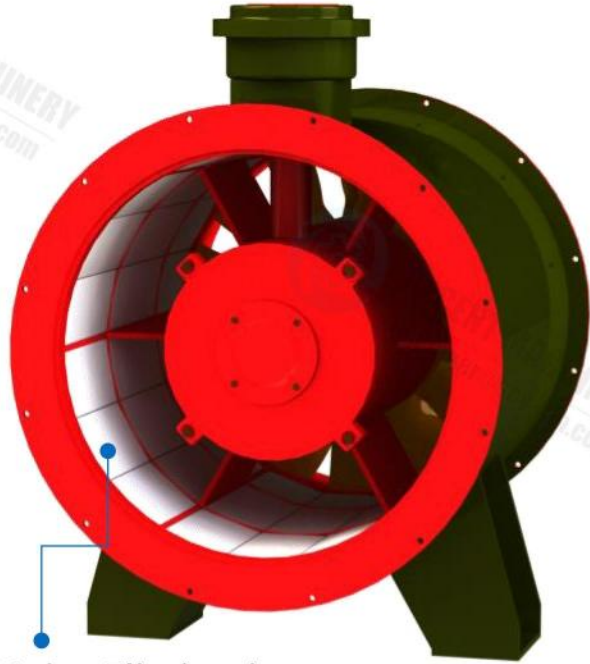
The traditional static balance method is canceled, and single side dynamic balance is adopted, so the balance accuracy is higher.

### 3. Performance Advantages:

Special motor technology: according to the load characteristics of the counter rotating structure motor, optimize the electromagnetic design scheme, improve the material level, and ensure the motor performance. Eliminate the heat dissipation device of the motor, reduce the motor loss, and the motor efficiency is higher.

B-spline stacked blade technology: through reasonable aerodynamic parameters and structural parameters, effectively control the aerodynamic noise of the fan and improve efficiency.

# // Noise Reduction Measures for Ultra Low Noise Integrated Local Fan



Panel Type Noise Elimination

## Embedded plate structure:

Silencing cotton modular panel assembly

### 1. Silencing Structure:

Panel type complete machine noise elimination structure - the noise elimination material adopts module design and can be directly replaced. The utility model solves the problem that the noise is increased due to the dust accumulated on the silencing cotton after a long time of use, and the silencing material cannot be replaced.

Radial annular noise elimination structure - the airflow passage increases, the noise elimination area increases, and the noise transmission path is changed by adopting reasonable micropore diameter and punching rate, and labyrinth resistance noise elimination design.

The upgrade research and development of the split muffler structure radial ring muffler has increased the noise reduction area to a greater extent.

### 2. Silencing Materials:

Upgrade from 40mm to 100mm thick, and from 45kg density superfine glass fiber cotton to 60kg.

The new environment-friendly material 50kg density polyester fiber cotton (environment-friendly and waterproof) is adopted.

Add 5-8mm thick sound insulation damping plate.

### 3. Noise Reduction Method:

The traditional sound absorption method has been upgraded to: sound absorption (silencing cotton)+sound insulation (damping sound insulation board)+change of transmission path (radial annular muffler/split muffler)

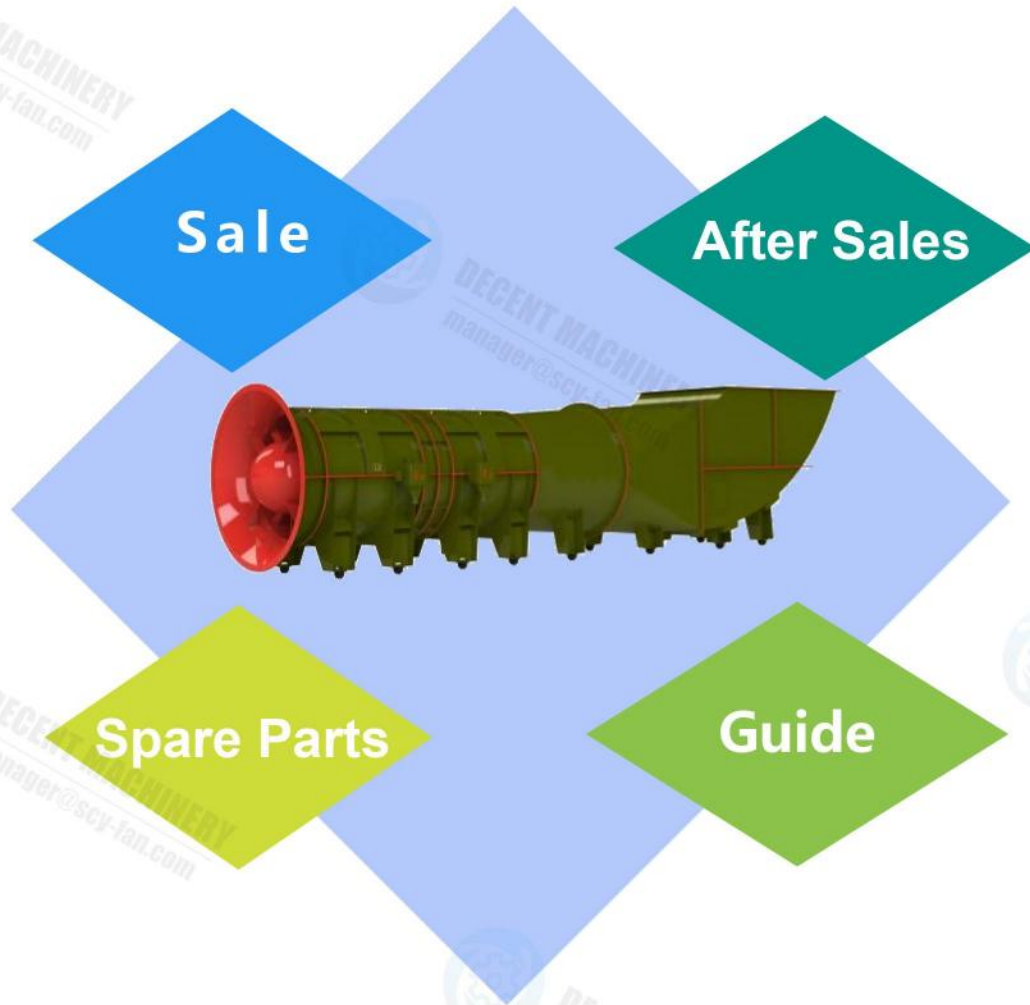
### 4. Motor Noise Reduction:

Improve the machining accuracy of motor parts and reduce motor running vibration

The imported silent bearing is adopted to reduce the running noise of the motor.

# Ventilator Service - Main Ventilator

## Professional Service of Main Fan System ("4S")



### ◆ Sales of Main Fan

Main fan, damper, electric control system, online monitoring and fault diagnosis system (unattended system, non-stop fan reversing system), etc

### ◆ After-Sale Service

Installation and commissioning, performance testing, maintenance, transformation and upgrading, as well as technical support and troubleshooting during use.

### ◆ Spare Part

Provide parts and components of main fan system products

### ◆ Survey

Users feed back the operation status of the main fan system, and the company proposes solutions; Follow up the user's product operation status, and communicate on site; Use the company's main fan remote monitoring system to track and monitor the operation status of the main fan system in a timely manner, and find and feed back problems in a timely manner

# Ventilator Service



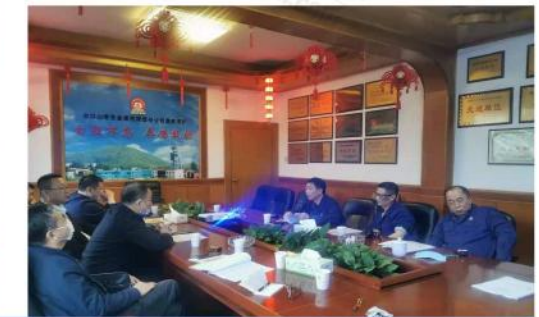
EPC Installation: FBCDZ - No 28 main fan of Yan'an Hecaogou Coal Industry Co., Ltd



Maintenance and Overhaul: Zhongtai Energy Zhujiamao Coal Mine FBCDZ No 25 main fan



Efficiency Improvement and Transformation: Henan Dayou Energy Qianqiu Coal Mine FBCDZ No 19 Main Fan



- Field Survey of Yima Coal Mine
- Technical Exchange of Shuikoushan Kangjiawan Mine



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# Ventilation Butler Service-on-Demand Ventilation Operation General Contracting Service

## On Demand Ventilation Case-China ColorAfrica Mine Zambia Chambishi Copper Mine



Since 2017, under the guidance of the national policy of "the Belt and Road", the company has cooperated with China National Trade Corporation to jointly build the "on-demand air supply" project of Chambishi Copper Mine in Africa, Zambia, to create a set of adaptive intelligent mine ventilation system for customers. Provide "butler type" services for all ventilation related equipment and general contracting of ventilation operation.

Equipment: 2 sets of FCDZ-NO38/2 \* 1000KW main fans, auxiliary fans under the shaft, automatic control system of stope fans and main fans, automatic air doors, air duct cloth, complete set of intelligent local ventilation equipment, switches, frequency conversion control cabinet, etc.

Intelligent ventilation scheme: 2 mines, more than 120 mining areas, more than 60 sets of schemes completed. Dispatch on-site technical service team for 5 times. More than 300 service days.

### On Demand Ventilation EPC Operation Service



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中国有色 赞比亚中色非矿

非洲第一座数字化矿山已经运行 **1015**天  
蜿蜒流淌的赞比西河见证了厚积薄发  
共同战役见证中非友谊  
世界最深的千米炸药垂直下放系统正式建成

央企超级工程 风雨同天提振战疫信心

# Ventilation Butler Service-on-Demand Ventilation Operation General Contracting Service

## On Demand Ventilation Case-China ColorAfrica Mine Zambia Chambishi Copper Mine

Comparison of Installation Effects of On Demand Ventilation Equipment in 473mL Stope of New Panel

Comparison Items	Before Installation	After Installation	Contrast Effect
Temperature	34°C	29°C	↓
Humidity	94%	88%	↓
Outlet Air Volume	4.46m <sup>3</sup> /s	11.44m <sup>3</sup> /s	↑
Fan Air Volume	19.2m <sup>3</sup> /s(P) 14.34m <sup>3</sup> /s(Q)	13.47m <sup>3</sup> /s ( P ) 14.34m <sup>3</sup> /s( Q )	↓
Air Leakage Rate Per Hundred Meters	47%	6.84%	↓
Exhaust Time	> 2H	40min	↓
Visibility	30m	50m	↑
Personal Sense	Sultry	Moderate	↓
Number of Fans	3 sets	2 sets	↓
Fan Power	150kW+45kW	45kW+37kW	↓
Quantities	Secondary	Secondary	→
Difficulty of Ventilation Management	Simple	Secondary	↑

# // Mine Dust Removal



- A large amount of dust generated in the production process of the mine is discharged to the ground with the ventilation of the mine
- Smoke and dust produced by underground blasting and containing harmful gas
- The exhaust air pollutants of the mine cause air pollution, which affects the production and life of the mine and seriously affects the image of the modern mine
- Dust control of exhaust shaft is of positive significance for realizing green mining of coal mine



# // Mine Dust Removal

## Wet Resonance Grid Dedusting Technology



### System Composition

The wet resonance grid air shaft exhaust outlet dedusting device is to set the high-pressure spray system, resonance grid dedusting system and dehydration system in the exhaust duct of the main fan of the mine.

### System Principle

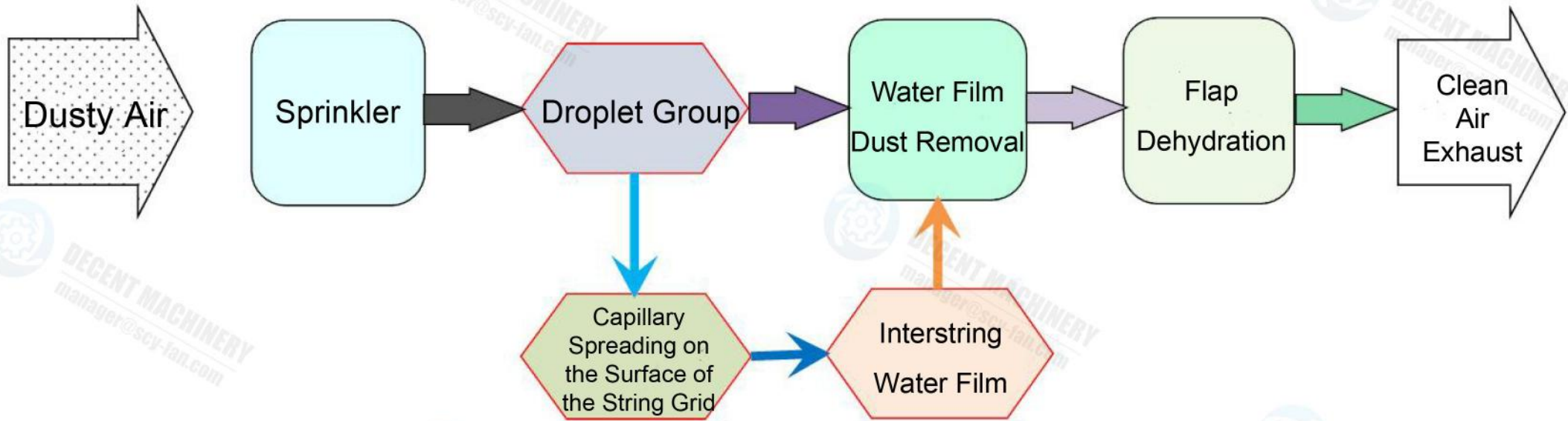
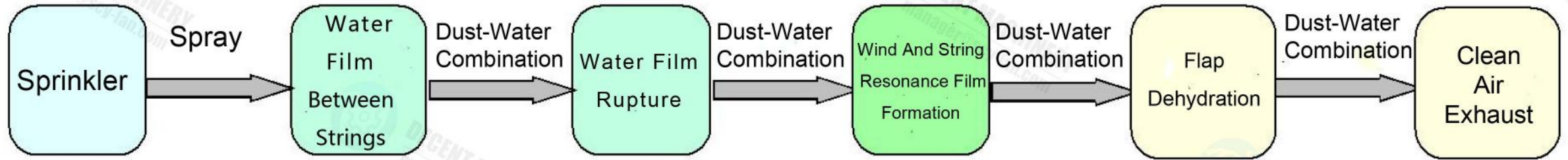
The most popular principle is to force all dusty air to "bathe" through a water film. The dust is left in the water. The air containing water mist is demisted by the dehydration plate, and the clean air is discharged to the atmosphere.

### System Effect

The wet resonance grid dedusting system of the air shaft has low operating power, the total dust removal efficiency is higher than 95%, the emptying concentration is lower than 3mg/m<sup>3</sup>, and the total resistance of the system is small.

# Mine Dust Removal

## Principle and Process Of Wet Resonance Grid Dedusting





# Mine Dust Removal

## Application of Wet Resonance Grid Dust Removal Technology -- Mine Air Outlet Purification



Dust Removal Transformation of Fan Outlet in Fankou Lead Zinc Mine

A large amount of dust is produced in the production process of Fankou Lead Zinc Mine, and fine dust is discharged into the atmosphere with the underground air flow, polluting the atmospheric environment. Therefore, a spray dust reduction system is set up in the underground return air flow of Fankou Lead Zinc Mine, which has achieved certain results. However, spray dust reduction needs to consume a certain amount of compressed air. The water source of spray is from the underground water, so the nozzle is easy to block, and management and maintenance are inconvenient. Fankou Lead Zinc Mine plans to transform the Xinnan air shaft, and change the underground spray dedusting to the air outlet end of the fan, so as to facilitate maintenance and management and meet the requirements of emission standards.

Air Outlet of Fankou Lead Zinc Mine

# // Mine Dust Removal



Dust Removal Transformation of Fan Outlet in Fankou Lead Zinc Mine

## Technical Requirements:

Maximum exhaust air volume of air shaft: 260m<sup>3</sup>/s;

Resistance of dust removal system: < 250Pa;

Efficiency: meet the Emission Standard of Pollutants for Lead and Zinc Industry

## Transformation Effect:

The average dedusting efficiency is 90.6%, and the average emptying concentration is 4.1mg/m<sup>3</sup>,

The simple dedusting facilities in the underground return air lane are canceled, which reduces maintenance and eliminates the safety risks of maintenance operations

No air compressor is required for air supply, and the energy saving effect is very obvious. The annual power saving is more than 400 × 10<sup>4</sup> kWh, more than 2.6 million yuan.

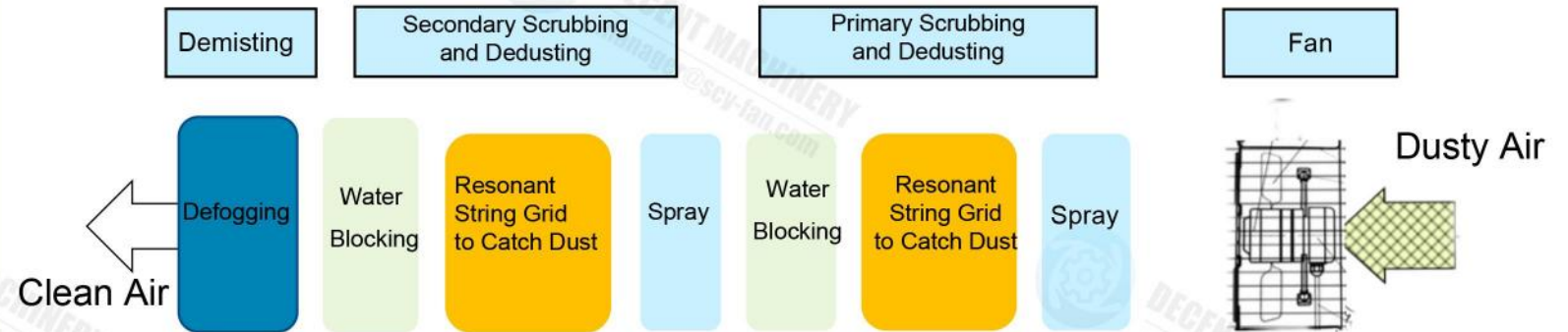
Purification Effect of Fankou Lead Zinc Mine



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# Mine Dust Removal

## Application of Wet Resonance Grid Dust Removal Technology -- Treatment of Diesel Vehicle Exhaust



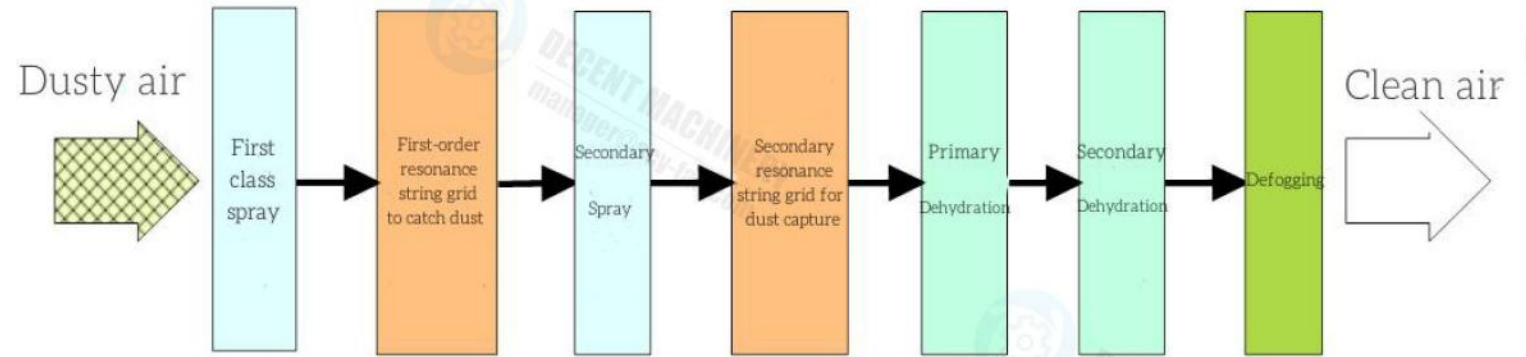
### Washing and Purification Scheme

The method of spray washing and filtering is used to wash and filter the smoke and dust in the air stream by forming a water film on the vibrating wire grid plate through spray. Then, the water baffle is used to separate the air and water, and the mist eliminator is used to remove the fine water mist in the air. In order to ensure the quality of recycled air flow, multistage filtration is designed.

**Diesel Vehicle Exhaust**

# Mine Dust Removal

## Application of Horizontal Multi Stage Wet Resonance Grid Dust Removal Technology -- Dust Control in Underground Crushing Station



The crushing station of Fankou Lead Zinc Mine is located underground, and the dust has a certain viscosity. Therefore, the dust remover is required to be able to handle sticky dust and facilitate cleaning and maintenance. At the same time, the purified air after dust removal is required to enter the underground air flow system for recycling. Therefore, the dust removal efficiency of the dust removal device should be high to meet the requirements of the air quality standard of the underground air flow. Therefore, a horizontal multi-stage wet resonant chord grid dedusting device is designed and developed.

**Dust Control of Underground**

# // Mine Dust Removal

## Application of Wet Resonance Grid Dust Removal Technology -- Movable Variable Frequency Wet Dust Removal Device



The exhaust jet fan is used to pump the dust laden dirty air from the working face into the wet chord grid purification device, and the dust laden dirty air is purified through the spray mist from the nozzle and the water film attached to the wet chord grid. The dust mud slurry in the purification unit can be recycled after settling in the circulating water tank. The blasting fume discharge time can be shortened from more than 2h to 30min to improve the ore extraction efficiency. The air volume can be adjusted in real time according to the dust concentration, saving energy and high efficiency.

Treatment of Dust Laden Air in

## // Mine Dedusting - Dry/Wet Deduster



**Wet Dust Remover**

### **Type 200-500**

**Features:** Wet resonance grid dedusting technology is used. Small power consumption, small volume, small resistance, high dust removal efficiency and simple maintenance. It is also used for multi-level combination assembly.



**Dry Dust Remover**

### **Type 200-600**

**Features:** It also features low energy consumption, zero water consumption, no secondary pollution and simple maintenance. Modular structure is adopted, and combined assembly application is carried out according to the requirements of dust concentration at different operating points and air volume.