

Acid Dew Point Analyzer



SOLIDAT (Solid Applied Technology Co., Ltd.) is a member of the Solid Group. It was established in 1981. At the beginning of its establishment, it mainly served the Aviation Industry Co., Ltd. (<http://www.iai.co.il>), providing radar, vibration Analytical technical support services, and responsible for the maintenance of large-scale equipment in the plant. In 1996, SOLIDAT acquired SOLID SCIENTIFIC RESEARCH AND DEVELOPMENT LTD, obtaining leading ultrasonic and sonar technology and the trademarks of "MonoScan" and "SMARTSCAN"; in 1999, SOLIDAT acquired SOLTA ADVANCED TECHNOLOGIES LTD., acquired leading radar technology and SOLTASCAN trademark.

After 40 years of development, SOLIDAT has become a world-renowned multinational group company that provides high-tech intelligent equipment. It is leading the way in vacuum technology, combustion optimization technology, vibration analysis, ultrasonic technology, sonar technology, radar technology, and electromagnetic induction technology world frontier. As a leader in advanced automation technology, SOLIDAT is committed to providing excellent products and services for a wide range of fields such as smart cities, smart resource utilization, high efficiency and energy saving, and smart factories. Products are applied to many industries such as municipal administration, electric power, chemical industry, oil and gas, food and beverage, water and sewage treatment, energy, metallurgy, papermaking, shipbuilding and environmental testing.

Whether it is one-time equipment supply, technical support or long-term energy-saving solutions, system equipment management solutions, SOLIDAT can allow users to enjoy serialized services. SOLIDAT goes all out for every project from design to construction and strives for excellence. Through systematic analysis and evaluation, design an effective construction plan, and strictly supervise the implementation to control the construction quality. The construction engineer for the project, must be trained in our factory to ensure the correct application of the instruments and ultimate customer satisfaction.

SOLIDAT continues to develop itself, adhering to the spirit of spaceflight, has achieved some results, and won some affirmations in some breakthrough fields. We will keep innovating. Let our users share the convenience and joy brought by technological updates!

【Business Scope】

Ultrasonic technology: ultrasonic liquid level gauge, externally mounted sonar liquid level gauge, externally mounted sonar flowmeter, ultrasonic interface instrument, ultrasonic multi-layer sludge analysis system, micro-vibration multi-parameter analysis system...

Microwave technology: 6.3G radar, 26G radar, 78G radar, 120G radar, guided wave radar, microwave switch, microwave solid flowmeter....

Vibration technology: mechanical vibration analysis expert system, vibration sensor, tuning fork switch, rotary switch...

Electromagnetic technology: electromagnetic flowmeter, magnetostrictive liquid level gauge, v particle flow level gauge, y particle ash analyzer...

Vacuum system: high-efficiency Roots pump, water ring pump, vacuum maintenance system

Combustion optimization: coal quality analysis system, fly ash carbon content analysis system, automatic sampling system, SCR flue gas NOx concentration plane distribution online monitoring....

Other technologies: high temperature and high pressure sealing (275bar@450°C, 413bar@80°), anti-corrosion, single crystal silicon pressure transmitter, electric actuator.....



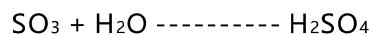
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Acid Dew Point Analyzer



■ Working Principle

In industrial boilers or power plant boilers, petroleum refining enterprises, heating furnaces, fossil fuels (natural gas, refinery dry gas, coal, heavy oil, etc.) are generally used. These fuels contain a certain amount of sulfur to a greater or lesser extent, and SO₂ will be produced during the over-oxygen combustion process. Due to the presence of excess oxygen in the combustion chamber, under normal excess air conditions, a small amount of SO₂ further combines with oxygen to form SO₃, Fe₂O₃ and V₂O₅ (the flue gas and the surface of the heated metal surface contain this component). About 1~3% of all SO₂ is converted into SO₃. SO₃ gas in high-temperature flue gas does not corrode metals, but when the flue gas temperature drops below 400°C, SO₃ will combine with water vapor to form sulfuric acid vapor. The reaction formula is as follows:



When sulfuric acid vapor condenses on the heating surface at the rear of the furnace, low-temperature sulfuric acid dew point corrosion will occur. At the same time, these sulfuric acid liquids condensed on the low-temperature heating surface will also adhere to the dust in the flue gas to form sticky ash that is difficult to remove, making the flue gas channel unsmooth or even blocked, and increasing resistance, thereby increasing the power consumption of the induced draft fan. The occurrence of corrosion and ash blocking is a hazard to the working condition of the boiler heating surface.

Since the flue gas contains both SO₃ and water vapor, the two will produce H₂SO₄ steam when they meet, which will increase the acid dew point of the flue gas. When the exhaust temperature is lower than the flue gas acid dew point temperature, H₂SO₄ steam will stick to the flue and heat exchanger to form H₂SO₄ solution, which will corrode the equipment, causing the heat exchanger to leak and the flue to be damaged. In the device supporting the heating furnace or boiler, its energy consumption accounts for about 50% of the total energy consumption of the device, and the exhaust temperature affects the

thermal efficiency of the heating furnace and boiler. The higher the exhaust temperature, the lower the thermal efficiency. For every 10°C increase in the exhaust temperature, the thermal efficiency decreases by about 1%. If the exhaust temperature is too low, if it is lower than the flue gas acid dew point temperature, it will cause equipment corrosion and cause hidden dangers to the safe operation of the heating furnace and boiler. The reasonable exhaust temperature of heating furnaces and boilers should be slightly higher than the acid dew point temperature of flue gas.

Therefore, determining the acid dew point temperature of heating furnaces and boilers is the key to improving their operating thermal efficiency and reducing operating safety hazards. At present, in combustion boilers and petroleum refining enterprises, in order to obtain the flue gas acid dew point of heating furnaces and boilers, flue gas acid dew point analyzers are generally used for monitoring.

■ Product features

- Dual-channel probe measurement: 1 acid dew point analyzer can simultaneously measure oxygen content, water dew point value, moisture content, and acid dew point value.
- Multi-channel output control: The instrument has two 4 ~ 20mA current outputs and computer communication interfaces RS232 and RS485.
- Measurement range: 0°C~200°C acid dew point value, 1ppm~100% oxygen content, 0 ~100% water vapor, -50°C~100°C dew point value, and water content (g grams/Kg per kilogram).
- Alarm setting: The instrument has 1 general alarm output and 3 programmable alarm outputs.
- Automatic calibration: The instrument will automatically monitor each functional system and automatically calibrate to ensure the accuracy of the instrument during measurement.
- Intelligent system: The instrument can communicate with humans and complete various set functions according to the preset settings.
- Display output function: The acid dew point analyzer has a strong function of displaying various parameters and has a strong output and control function of various parameters.
- Variable parameter selection: It can be selected according to different fuels (lignite, washed coal, coal powder, natural gas, blast furnace gas, heavy oil, various grades of fuel oil, etc.)SO₂ generated by different sulfur contents and the conversion rate of each fuel into SO₃, and directly obtain the high-precision combustion flue gas acid dew point value of each fuel.

■ Technical Parameters



Acid dew point analyzer



Probe

Display mode	32-digit English display
Alarm	1-way general alarm; 3-way general alarm
Power supply	85V~264V 3A
Correction	Automatic correction without manual adjustment
Range:Set with keyboard	0°C~200°C acid dew point value 0~ 100% water vapor 0~100% humidity value 0~ 10000g/Kg -50°C-100°C dew point All output ranges are adjustable
Output	2-way 4~20mA DC linear Acid dew point, water vapor, water content, Water dew point, residual oxygen 4-way program alarm relay RS232 serial communication RS485 network communication
Output full amplitude and lower limit	The full amplitude and lower limit values can be freely selected according to user requirements to achieve the highest accuracy
Accuracy, repeatability	The oxygen measurement accuracy of the instrument and probe is $\pm 1\%$ Repeat accuracy is $+0.5\%$, and other measurement accuracy is calculated based on the oxygen measurement accuracy
Reaction speed	Indirect heating measurement is about 3S Direct heating is about 30S Core probe reaction speed is 0.0001S

Sensor Model	Heated type; High temperature non-heated type
Probe length	100mm, 190mm, 250mm, 350mm, 500mm, 750mm, 1000mm
Maximum operating ambient temperature	Instrument 40-60°C, 5%-95%RH
Instrument weight	3.0Kg
Reference gas connection	1/4 inch pipe thread
Reference gas flow	50CC/min
Probe cable	The maximum length of the dedicated cable with aviation plug is no more than 100 meters
Instrument size	(Width)300mmx (Height)180mm x (Thickness)100mm
Probe weight	0.6Kg plus 0.33Kg per 100mm length
Probe operating temperature	0-720°C optional 1200 Heating controlled by analyzer
Maximum temperature of the probe junction box	130°C
Reference gas supply	Micromotor vibration air pump inside the instrument
Instrument installation method	Wall mounted, portable

■ Application range

The acid dew point analyzer measures the acid dew point temperature in the flue gas of boilers and heating furnaces in real time online. According to the measured acid dew point temperature, the exhaust temperature of boilers and heating furnaces can be effectively controlled, the low-temperature sulfuric acid dew point corrosion of equipment can be reduced, the operation thermal efficiency can be improved, the boiler operation safety can be increased, and the service life of equipment can be extended.

■ Application characteristics

After using the acid dew point analyzer, the acid dew point value, oxygen content, water vapor (% water vapor value) or dew point value (-50°C~100°C) and water content (G grams/KG per kilogram) and humidity value RH in the flue gas of boilers and heating furnaces can be accurately known. Users can control the exhaust temperature within a range slightly higher than the flue gas acid dew point according to the display of the instrument or the 2-way 4-20mA output signal to avoid low-temperature acid dew point corrosion and increase boiler operation safety.



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