RIKEN KEIKI

Applications in Paper Manufacturing Market and Introduction to Gas Detectors and Alarms for Safety and Security

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Document contents

- About Riken Keiki
- Why do we need gas detectors?
  Risks associated with toxic gases
- Applications in paper manufacturing market
- Major examples of accidents
- Product information
- International agents

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About Riken Keiki

About Riken Keiki

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RIKEN

1939

Riken Keiki

Headquarters
To be completed in September 2018 (conceptual drawing)

Riken Keiki was originally established to commercialize and sell detectors for preventing explosions in coal mines and on oil tankers.

About Riken Keiki

Optical Gas Indicator Model 3 (1939)

Certification
National heritage of analytical and scientific instruments
2014

Methane gas measurements in coal mine

Company profile

Company name	Riken Keiki Co., Ltd.	
Established	March 15, 1939	
Location	Headquarters: Development Center:	2-7-6 Azusawa Itabashi-Ku, Tokyo 2-3 Minamisakae-cho, Kasukabe-shi, Saitama
Factories	Hakodate-shi, Hokkaido; Sakurai-shi, Nara (affiliated company)	

Headquarters

To be completed in September 2018
(conceptual drawing)

Development Center

About Riken Keiki

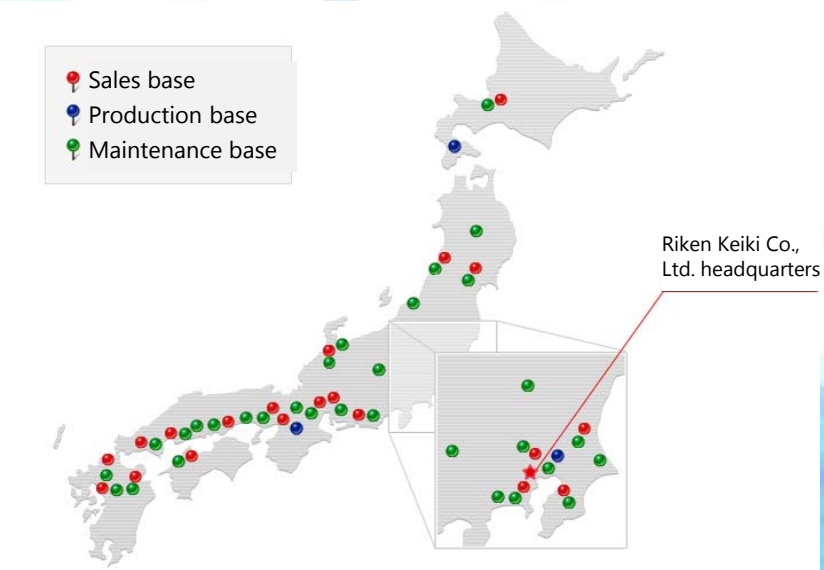
Headquarters
(Itabashi-Ku, Tokyo)

Development Center
(Kasukabe-shi, Saitama)

To be completed in September 2018
(conceptual drawing)

Locations of sales offices

◆Domestic◆



◆Global◆

Company profile

Various bases	Domestic sales and branch offices: 20 locations Service stations: 32 locations Global bases: 7 locations
Major sales items	Combustible gas detectors and alarms Gas detectors and alarms designed to prevent oxygen deficiency accidents Toxic gas detectors and alarms Combined gas detectors and alarms Various measuring instruments for environmental measurements and other instruments
Capital	2,565.5 million yen
Number of employees	965 (non-consolidated), 1,127 (consolidated) * As of September 30, 2017

Hakodate Factory
(Hakodate-shi, Hokkaido)

Nara Factory
(Sakurai-shi, Nara)

Company history

1939	Riken Keiki Co., Ltd. established to produce and sell optical gas detectors, photo-elasticity apparatuses, and other precision instruments invented and developed by RIKEN
1959	Start production and sale of combustible gas alarms and detectors (catalytic combustion type).
1967	Start production and sale of oxygen measuring instruments (OX-1).
1970	Start production and sale of monitoring tape type measuring instruments (FP-200).
1972	Start production and sale of non-dispersive infrared measuring instruments (RI-550).
1975	Start production and sale of electrochemical type measuring instruments (EC-231).
1986	Start production and sale of photoemission yield spectrometers (AC-1).
2009	70th anniversary of founding
2014	Start production and sale of portable X-ray diffractometers equipped with XRF (DF-01).
2015	Start production and sale of portable multi gas detectors (GX-6000), first product of its kind in Japan capable of housing photoionization detectors (PID).

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Why Do We Need Gas Detectors?
Risks Associated with Toxic Gases

Need for gas detectors (combustible gases)

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Criteria set by United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

According to the United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS), a combustible gas (or flammable gas) is defined as follows:

A combustible or flammable gas is a gas having an explosive (flammable) range when mixed with air under atmospheric conditions of 20°C and standard pressure of 101.3 kPa.

Gases falling under this definition are further subdivided into the following two categories based on the severity of the associated risk:

Category 1 (Danger: Extremely flammable gas)

Gases capable of igniting at 20°C and standard pressure of 101.3 kPa when occurring in a mixture of 13% or less by volume with air or having an explosive (flammable) range of at least 12% when mixed with air regardless of the lower explosion (flammable) limit

Category 2 (Warning: Flammable gas)

Gases, other than those in Category 1, which are gaseous at 20°C and a standard pressure of 101.3 kPa and have an explosive (flammable) range when mixed with air

We need gas detectors because flammable gas leaks can lead to explosions.

Need for gas detectors (definition of permissible concentration)

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Definition of permissible concentration

Even when workers are exposed to hazardous substances at work sites, no adverse health effects should emerge as long as the airborne concentration of the **hazardous** substance remains below the permissible concentration.

Recommended permissible concentrations have been set by the American Conference of Governmental Industrial Hygienists (ACGIH) and the Japan Society for Occupational Health. We use the **ACGIH** permissible concentrations.

Types of permissible concentrations

- **TWA (Time Weighted Average)**
  Time Weighted Average refers to time-weighted average concentrations over an 8-hour workday and 40-hour workweek of routine work to which workers may be repeatedly exposed without adverse health effects.

- **STEL (Short Term Exposure Limit)**
  Short Term Exposure Limit refers to exposure that does not lead to adverse health effects if each exposure does not exceed 15 minutes, the number of daily exposures does not exceed four, and the exposures are separated by at least one hour.

- **C (Ceiling value)**
  Ceiling Value refers to the upper limit that can never be exceeded.

We need gas detectors because leaks exceeding permissible concentrations can lead to accidents.

How human body reacts to oxygen-deficiency

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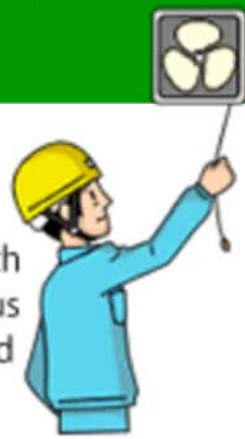
O2 Concentration 21%

Symptoms

Natural air

O2 Concentration 18%



Symptoms

Limit level for not causing serious health problems. Continuous ventilation is required

O2 Concentration 16%-12%

Symptoms

Rapid breathing, Increase in pulse rate, Loss of concentration, Headache, Nausea, Ear ringing

O2 Concentration 14%-9%

Symptoms

Stupor, Headache, Nausea, Cyanosis, Faintness on the entire body

O2 Concentration 10%-6%

Symptoms

Comatose, Loss of consciousness, Muscle spasm on the entire body

O2 Concentration 6% or less

Symptoms

Unconsciousness, Comatose, Cessation of breathing, Cardiac arrest, Die in 6 minutes

Effects of hydrogen sulfide (H_2S) on human body

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Concentration (ppm)	Effects and Toxicity
0.025	Smell vaguely. (It varies according to the individual.)
0.3	Smell clearly.
3 - 5	Smell moderate degree of objectionable odor.
10	Lower-level to irritate eyes' mucus membranes.
20 - 40	A strong odor. Lower-level to irritate lungs' mucous membranes.
100	Sense of smell is impaired in 2 - 15 minutes. Eyes and respiratory tract are irritated in 1 hour. 8 - 48 hours continuous exposure can lead to death.
170 - 300	1 hour exposure is the limit for not causing serious health problems.
400 - 700	Life-threatening exposure in 0.5 - 1 hour.
800 - 900	Bring on loss of consciousness, cessation of breathing and death.
1000	Bring on immediate loss of consciousness and death.

Effects of carbon monoxide (CO) on human body

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Concentration (ppm)	Effects and Toxicity
100	No noticeable effects even after breathing for a few hours.
200	A mild headache in around 1.5 hours.
400 - 500	Headache, nausea and ear ringing in around 1 hour.
600 - 1000	Loss of consciousness in around 1 - 1.5 hours.
1500 - 2000	Headache, vertigo and disabling nausea in around 0.5 - 1 hour, and losing consciousness.
3000 - 6000	Headache, vertigo, disabling nausea...etc. in a few minutes. 10 - 30 minutes exposure can lead to death.
10000	Bring on immediate loss of consciousness and death.

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Applications in Paper Manufacturing Market

Applications in paper manufacturing market

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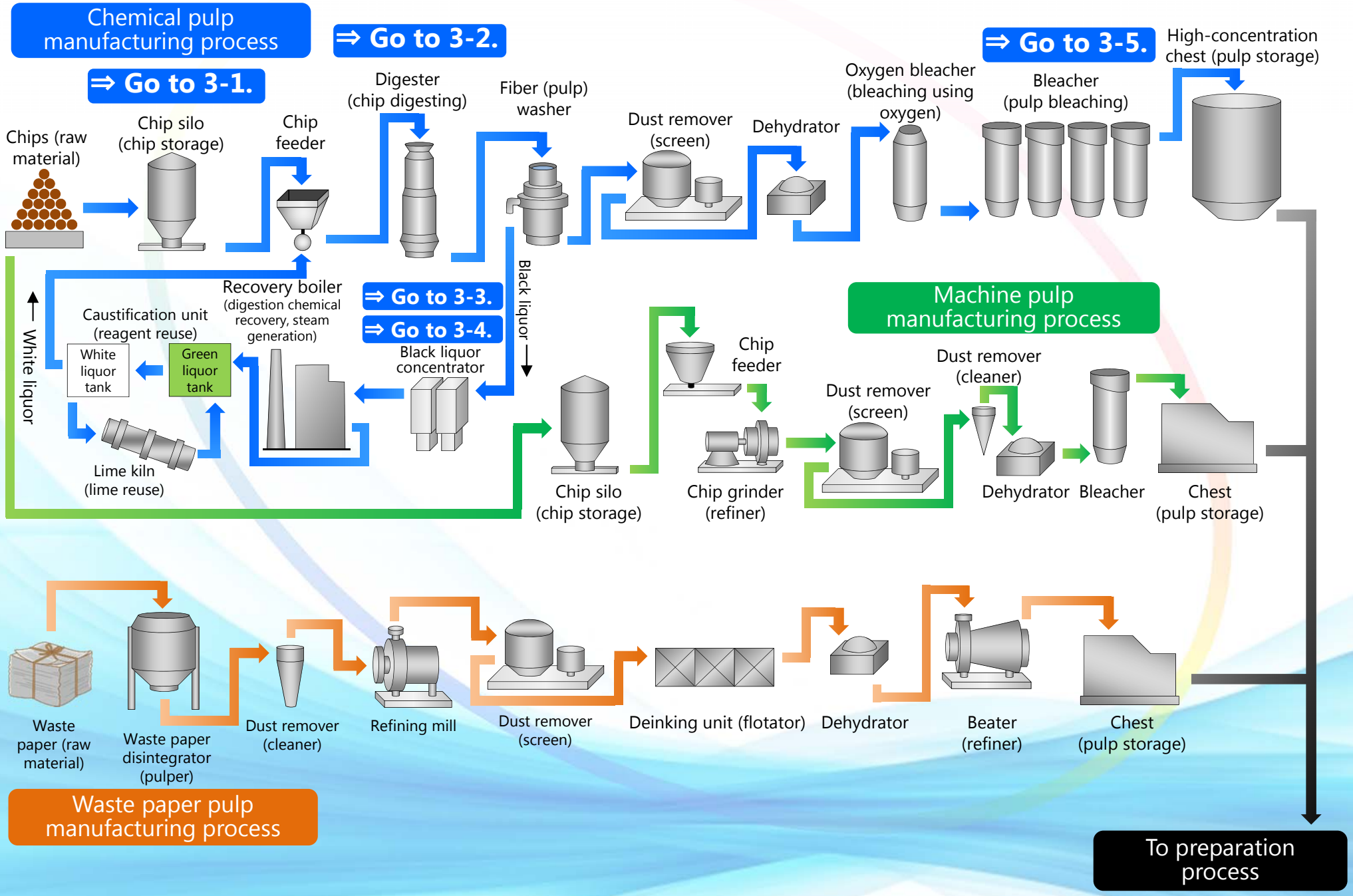
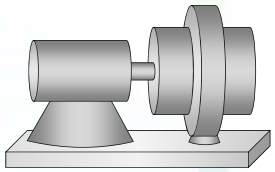
1. Overview of processes for the paper manufacturing market (pulp manufacture)
2. Overview of processes for the paper manufacturing market (preparation and papermaking)
3. Details of individual processes for the paper manufacturing market
   - 3-1: Chip silo
   - 3-2: Digester
   - 3-3: Ethanol manufacture
   - 3-4: Recovery boiler
   - 3-5: Bleacher (pulp bleaching)
   - 3-6: Measurement of environmental parameters during pulp manufacturing process
   - 3-7: Dryer section, solvent recovery unit, and deodorizer
   - 3-8: Natural gas and LPG fueled boiler facility

1. Overview of processes for the paper manufacturing market (pulp manufacture)



2. Overview of processes for the paper manufacturing market (preparation and papermaking)

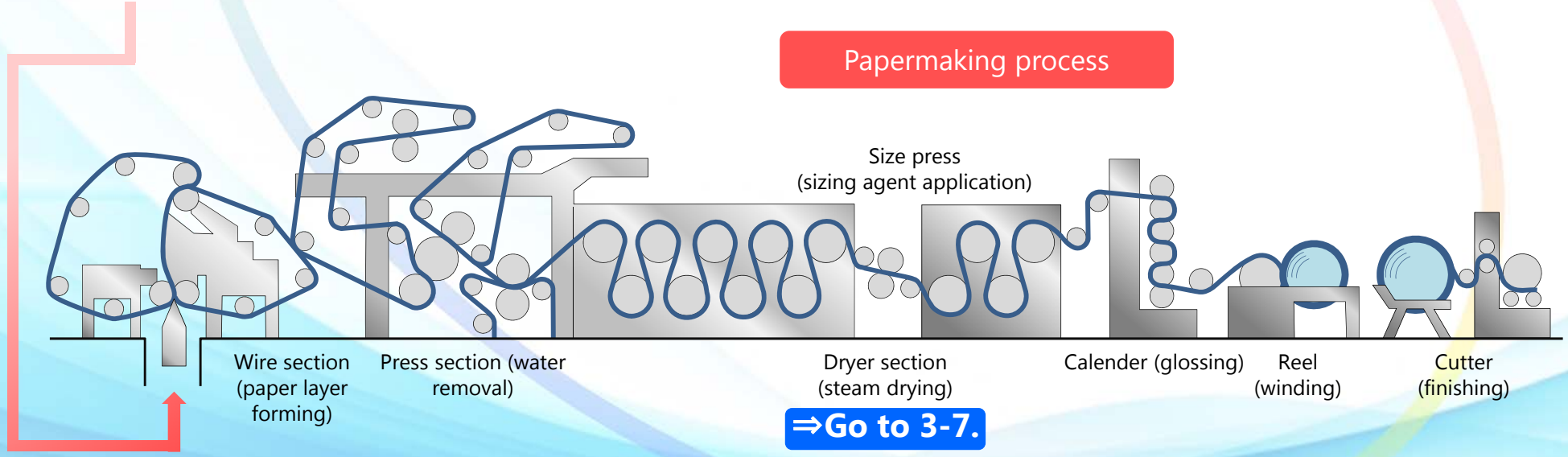
Pulp manufacturing process



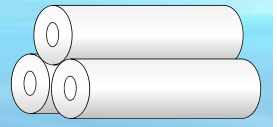
Preparation process

Beater
(refiner)

Papermaking process



⇒Go to 3-7.



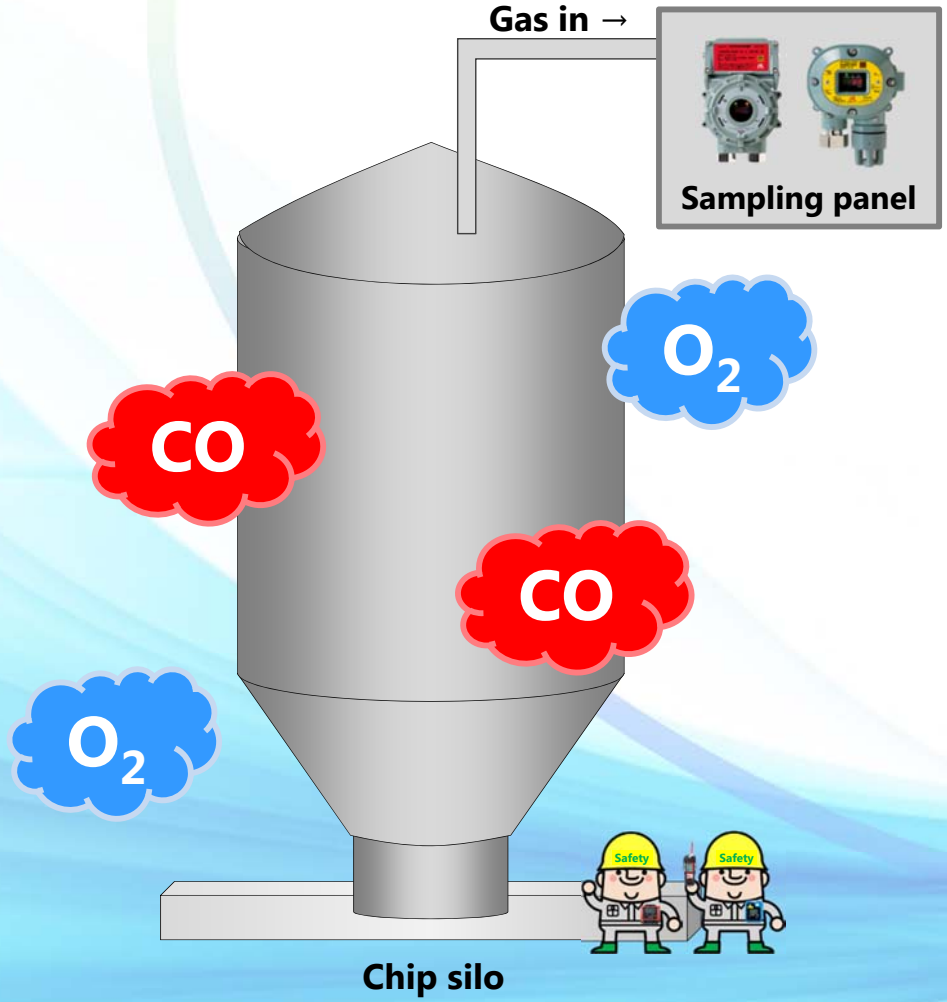
Finished product

3-1: Chip silo

Description: The wood chips that make up the raw material for the pulp are temporarily stored in the chip silo.

Hazardous risks: **Smoldering inside the enclosed chip silo poses oxygen deficiency and fire risks. The carbon monoxide (CO) generated by the smoldering poses poisoning risk.**

⇒ **Detecting CO to prevent fire and poisoning**
Measuring oxygen concentrations to prevent oxygen deficiencies



Chip silo

Suction-type CO detector heads

Smart Transmitter/
Gas Detector Head
Model: SD-1DEC

Flame-proof Pump
Model: RP-D58

Prework gas detectors

Portable
Multi Gas Monitor
Model: GX-8000

Portable
Multi Gas Detector
Model: GX-6000

Personal gas detectors for workers

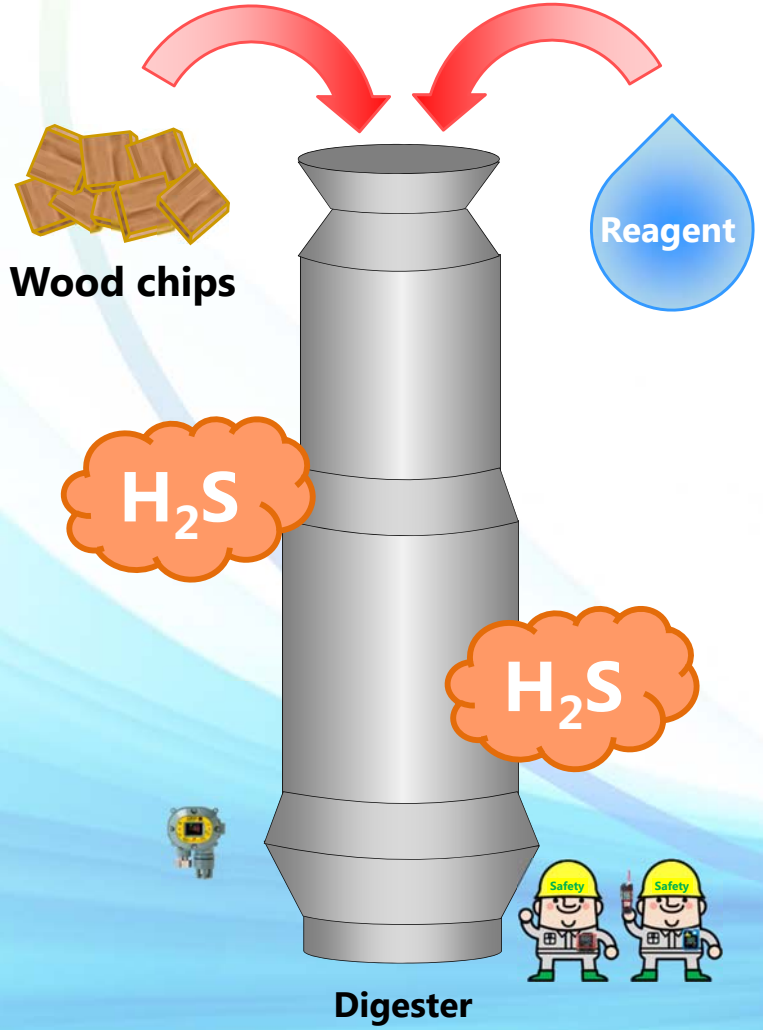
Personal Single
Gas Monitors
Model: 03 series

Four Gas Personal
Monitor
Model: GX-2009

3-2: Digester

Description: Wood chips are supplied with the reagent to the digester and cooked at high temperature and pressure to extract the fibers (pulp). The main components of the reagents are caustic soda and sodium sulfide (Na_2S).

Hazardous risks: **The Na_2S used to break down the wood chips poses poisoning risk due to the hydrogen sulfide (H_2S) generated by hydrolysis.** ⇒ **Detecting H_2S to prevent poisoning**



H_2S detector head

Smart Transmitter/ Gas Detector
Model: SD-1EC

Prework gas detectors

Portable Multi Gas Detector
Model: GX-6000

H_2S detectors for workers

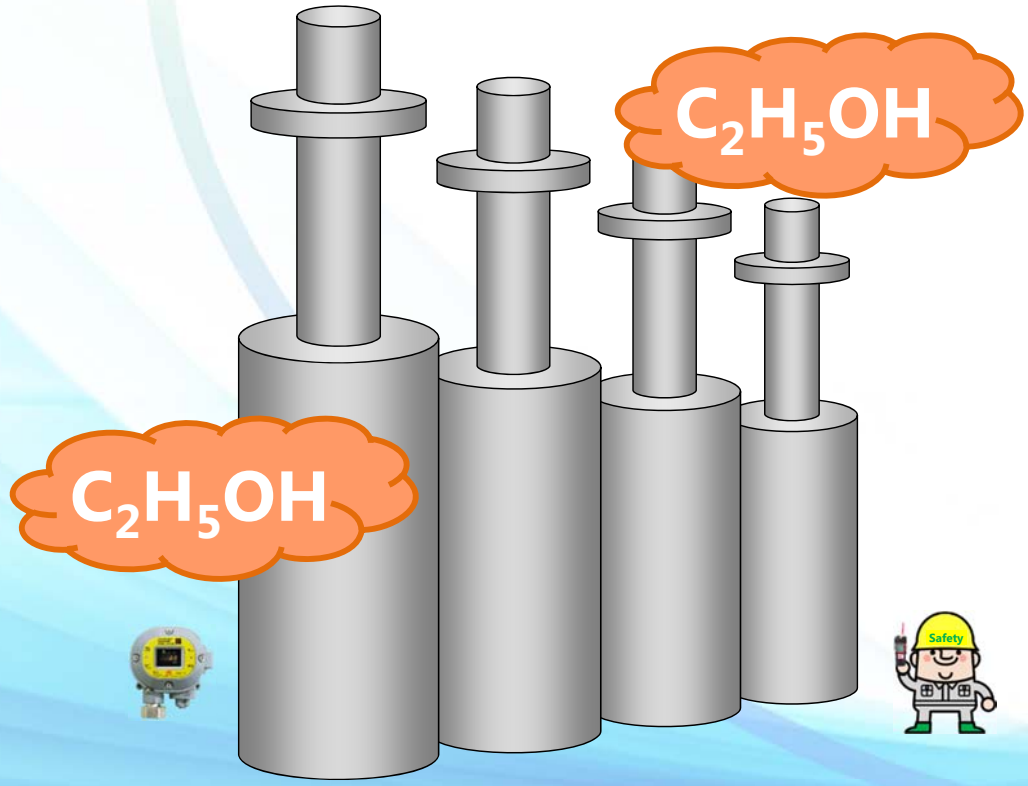
Personal Single Gas Monitor
Model: HS-03

Four Gas Personal Monitor
Model: GX-2009

3-3: Ethanol manufacture

Description: The fibers (pulp) are washed in the washer, where the waste liquid, known as black liquor, is removed. This black liquor contains dissolved lignin (constituent bonding the wood fibers together) and other components. The biofuel ethanol is manufactured from black liquor.

Hazardous risks: **Ethanol (C_2H_5OH) leaks from ethanol manufacture pose explosion and poisoning risks.** ⇒ **Detecting C_2H_5OH to prevent explosions and poisoning**



Distillation columns

C_2H_5OH detector head

Transmitter/
Gas Detector
Model: SD-1GH

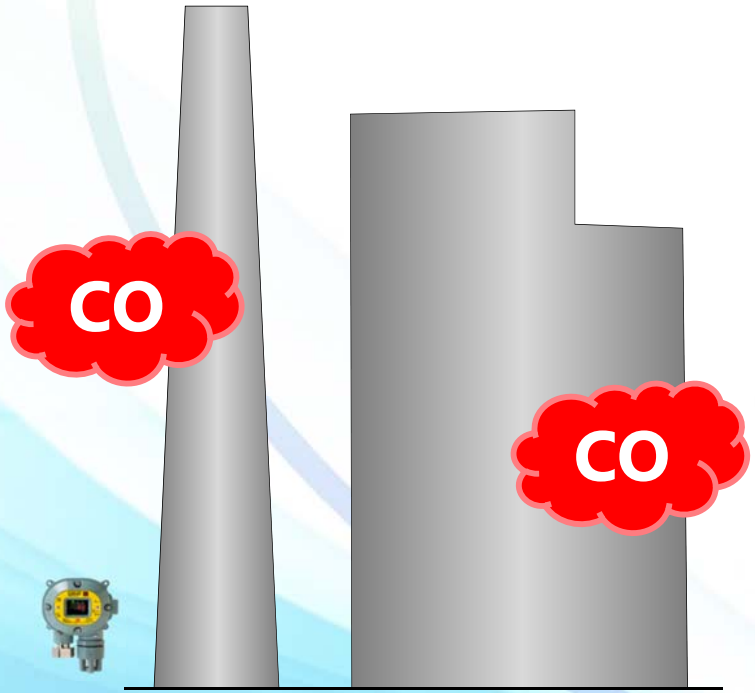
Prework gas detectors

Portable
Multi Gas Detector
Model: GX-6000

3-4: Recovery boiler

Description: The black liquor produced after washing the fibers is concentrated in the concentrator, and the combustion in the recovery boiler generates steam of high temperature and high pressure.

Hazardous risks: **Incomplete combustion inside the recovery boiler poses poisoning risk due to carbon monoxide (CO).** ⇒ **Detecting CO to prevent poisoning**



Recovery boiler

CO detector heads

Smart Transmitter/ Gas Detector
Model: SD-1EC

Indoor Carbon Monoxide Monitor
Model: EC-600

CO gas detectors for workers

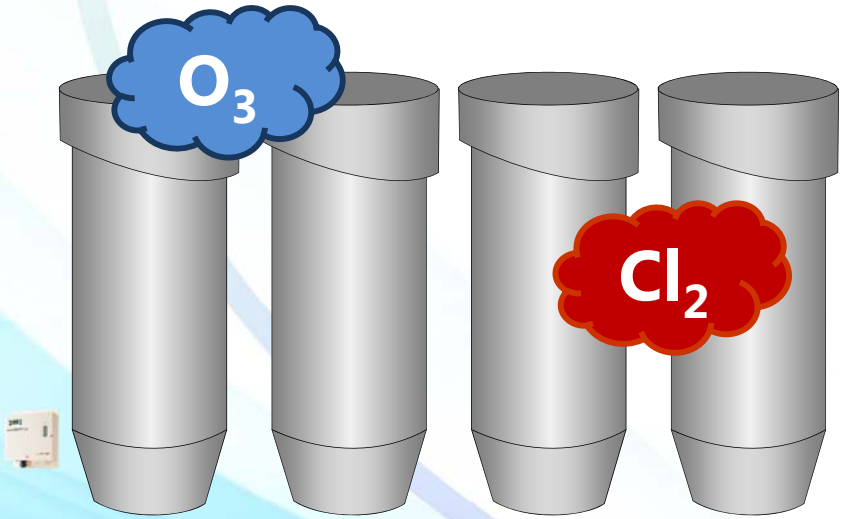
Personal Single Gas Monitor
Model: CO-03

Four Gas Personal Monitor
Model: GX-2009

3-5: Bleacher (pulp bleaching)

Description: Foreign matter such as sand and metal fragments are removed from the wood fiber by the dust removers (screen and cleaner) before additional bleaching in the bleacher. Bleaching involves chemicals such as chlorine dioxide (ClO_2), ozone (O_3), and chlorine (Cl_2).

Hazardous risks: Leaks of O_3 or Cl_2 used as bleaching agents pose poisoning risk. ⇒ **Detecting O_3 and Cl_2 to prevent poisoning**



Bleacher

O_3/Cl_2 detector heads

Toxic Gas Detector Head
Model: GD-K88Di

Intelligent Gas Detector
Model: GD-70D

Prework Cl_2 detector

Portable Multi Gas Detector
Model: GX-6000

Prework Cl_2/O_3 detector

Portable Toxic Gas Monitor
Model: SC-8000

3-6: Measurement of environmental parameters during pulp manufacturing process

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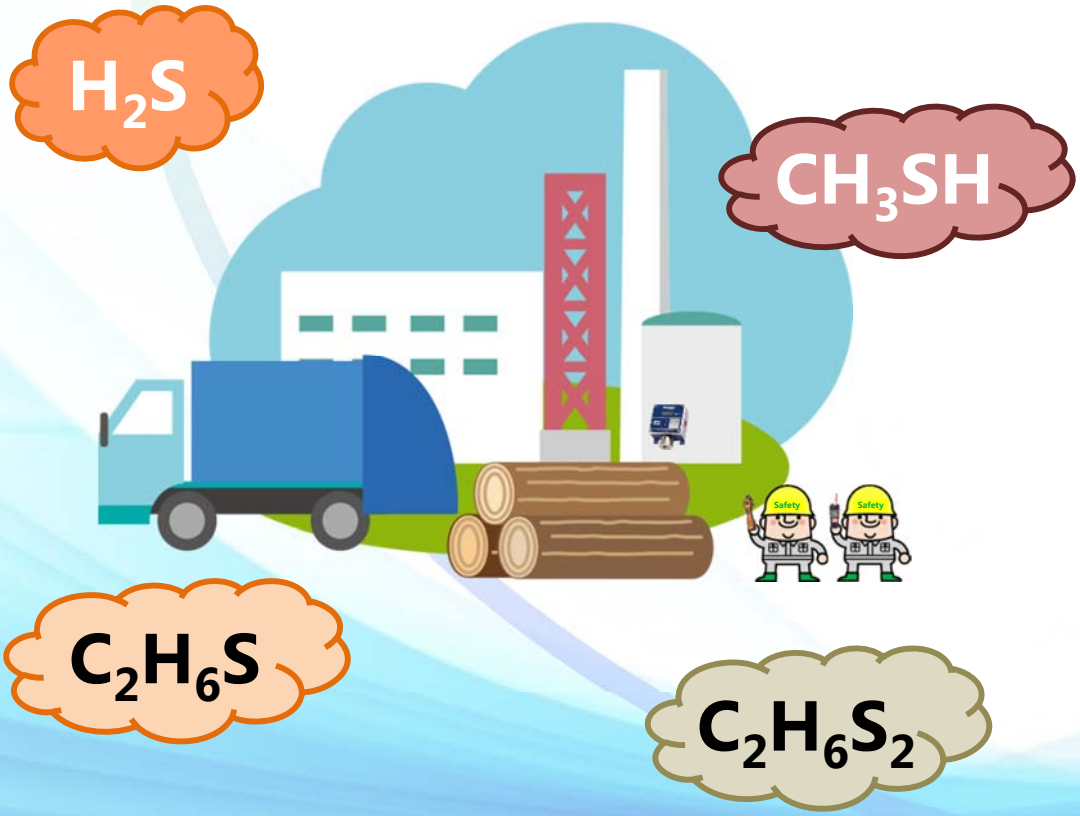
Description: The pulp manufacturing process generates four differed odorous sulfur compounds: hydrogen sulfide (H_2S), methyl mercaptan (CH_3SH), methyl sulfide (C_2H_6S), and methyl disulfide ($C_2H_6S_2$).

Hazardous risks: **The four sulfur compounds generated during pulp manufacture pose poisoning risk.**

⇒ **Detecting four sulfur compounds to detect odor sources and prevent poisoning**



$CH_3SH/C_2H_6S/C_2H_6S_2$ detector head

Fixed PID VOC Monitor
Model: RVOC

H_2S detector head

Highly Sensitive Toxic Gas Monitor
Model: FP-300

Prework $H_2S/CH_3SH/C_2H_6S/C_2H_6S_2$ detector

Portable Multi Gas Detector
Model: GX-6000

3-7: Dryer section, solvent recovery unit, and deodorizer

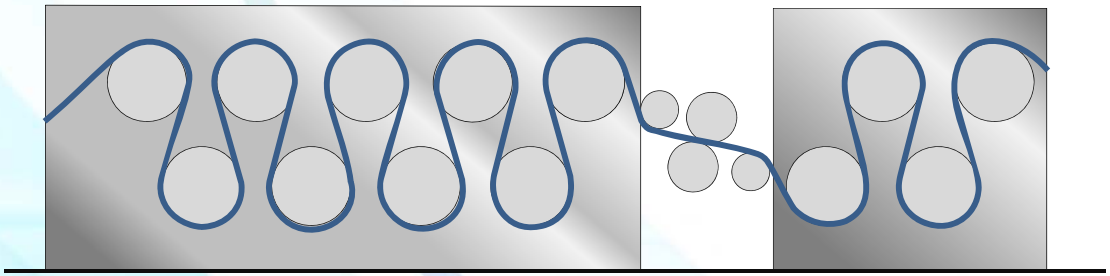
Description: In the dryer section (paper-drying process), the paper is brought into contact with steel cylinders heated by steam and dried to achieve the desired water content. This process also involves equipment used to recover solvents generated during the paper manufacturing process and a deodorizer.

Hazardous risks: **The volatile organic compound (VOC) solvent gas generated when drying coated paper poses poisoning and explosion risks.**
Waste gas from the solvent recovery unit and deodorizer poses poisoning and explosion risks.

⇒ **Measuring VOC to prevent poisoning and explosions**

⇒ **Preventing poisoning and explosions due to VOC and measuring source gas concentrations to improve efficiency**

VOC



Dryer section

VOC

Prework VOC detectors

Optical Gas Indicator
Model: FI-8000

Portable Multi Gas Detector
Model: GX-6000

VOC detector heads

Flame-proof Suction Type Gas Detector
Model: SD-D58

Fixed PID VOC Monitor
Model: RVOC

Compact Solvent Gas Monitor
Model: FI-815A

Gas Analyzer
Model: FI-800

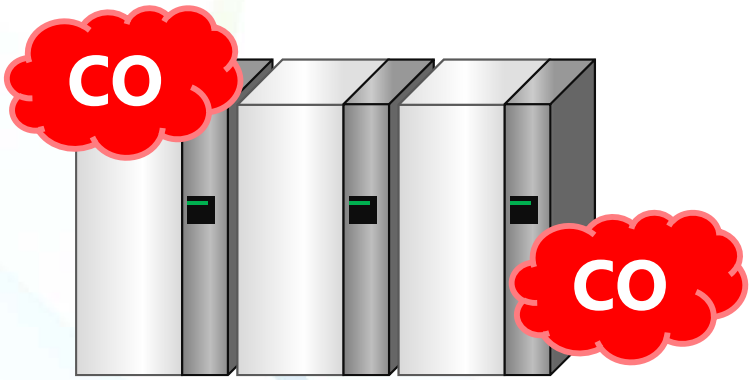
3-8: Natural gas and LPG fueled boiler facility

Description: Paper manufacturing plants may include a boiler facility fueled by natural gas or LPG.

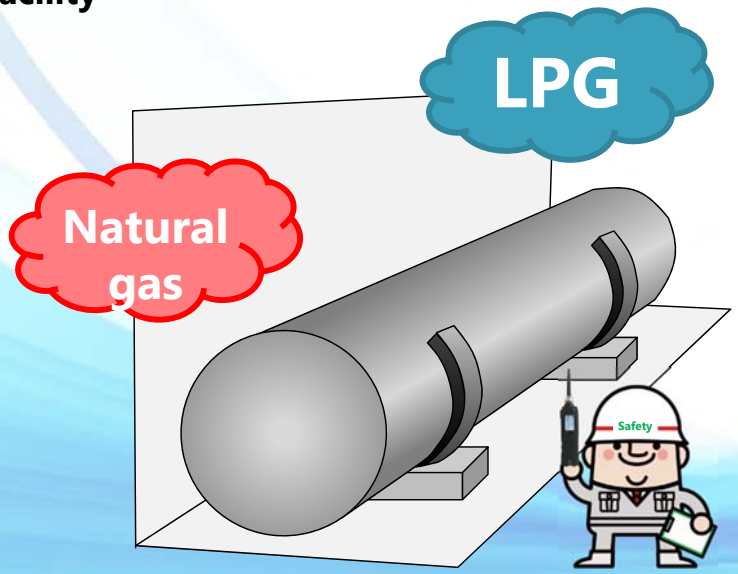
Hazardous risks: **The carbon monoxide (CO) generated by incomplete combustion inside the boiler facility poses poisoning risk. Leaks of natural gas or LPG from fuel pipes pose explosion risk.**

⇒ **Detecting CO to prevent poisoning**

⇒ **Detecting LPG leaks to prevent explosions**



Boiler facility



Fuel pipe

CO detector heads

Smart Transmitter/ Gas Detector
Model: SD-1EC

Indoor Carbon Monoxide Monitor
Model: EC-600

Natural gas/LPG leak detector

Portable Gas Leak Checker
Model: SP-220 TYPE ML

CO gas detectors for workers

Personal Single Gas Monitor
Model: CO-03

Four Gas Personal Monitor
Model: GX-2009

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Major Examples of Accidents

Prepared by extracting and processing materials from the Safety at Work Site
(Ministry of Health, Labour and Welfare: http://anzeninfo.mhlw.go.jp/index.html)

Case of inhalation of chlorine dioxide gas vaporizing from wastewater in drain channel inside paper manufacturing plant

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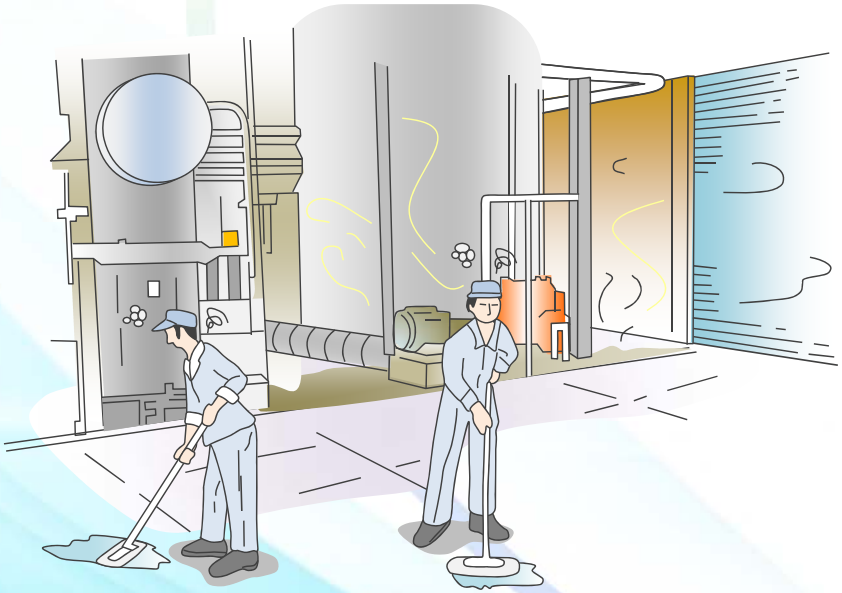

[Location of accident]

The accident occurred near a pulp liquid storage tank used in a pulp manufacturing process at a paper manufacturing plant.

[Cause of accident]

Chlorine dioxide vapors generated from wastewater draining during the bleaching process resulted in an incident as workers cleaned up pulp liquid sprayed from the top of the pulp liquid storage tank onto the floor on the first to third levels.

[Damage/injuries]

Workers reported feeling unwell and were administered oxygen after experiencing breathing difficulties. When their condition failed to improve, they were taken to the hospital. They were diagnosed with mediastinal emphysema and hospitalized.

Wearing gas detectors on a routine basis enables early detection of toxic gas leaks and improves work safety.

Case of hydrogen sulfide poisoning at pulp manufacturing plant

[Location of accident]

The incident occurred near a dissolving tank at a pulp manufacturing plant.

[Cause of accident]

The alkali solution valve was closed to acid-wash the calcium carbonate buildup on the heater used to heat the alkali solution. Granulated sulfamic acid was added to warm water inside the dissolving tank to adjust the acid cleaning solution. The alkali solution valve was not fully closed during the washing procedure, allowing the sulfamic acid to react with the alkali solution and generating hydrogen sulfide. The worker and supervisor inhaled hydrogen sulfide and lost consciousness.

[Damage/injuries]

Both victims regained consciousness quickly but were taken to the hospital by ambulance. There, they were diagnosed with hydrogen sulfide poisoning.

Wearing gas detectors on a routine basis enables early detection of toxic gas leaks and improves work safety.

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Product Information

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SD-1
SD-1RI
(For combustible gases)

SD-1GH
(For combustible/ toxic gases)

SD-1EC
(For carbon monoxide/ hydrogen sulfide)

SD-1OX
(For oxygen)

Smart Transmitter/
Gas Detectors

Model:
SD-1 series

Features

- Explosion-proof products that can be used in hydrogen/acetylene atmospheres
- Waterproof/dustproof enclosure (IP 65 equivalent) allows deployment in severe environments.
- Supports HART Communication Protocol, allowing transmission of more information over legacy analog 4-20 mA connections.

  * Excluding SD-1 (TYPE NC)
- SD-1RI, SD-1EC, and SD-1OX are SIL 2 certified in all parts of the functional safety standard, marking a first for Japanese manufacturers.
- Using the suction cap for the SD-1 series and connecting the detector to a suction pump or an aspirator unit enables suction type operation.

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SD-D58
(With concentration display)

GD-D58
(Without concentration display)

Features

- Explosion-proof product suitable for use even in hydrogen atmospheres
- Includes automatic abnormal flow-rate detection feature.
- Features modular replacement components for ease of maintenance.
- Dustproof/waterproof construction (Protection rating: IP 67 equivalent)
- Maintenance requires a single worker.
- The RP-D58 is also available as an explosion-proof pump.

Flame-proof Suction Type
Gas Detectors

Model: SD-D58

Model: GD-D58

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Portable Multi
Gas Monitor

Model:
GX-8000

Features

- Compact, lightweight design for portability
- Exia II CT4X certified for hydrogen explosion-proof compatibility
- IP 67 protection rating for peace of mind, even in harsh environments
- Powerful suction capacity with high flow-rate pump
- Large easy-to-read screen with backlight
- Bright high-visibility lamps and loud, audible alarm
- Simultaneous digital readout and analog bar indicator concentration display
- Compatible with dedicated waist belt (optional) to greatly improve fit and security during use

Type list

Components	Type	Gas types
5-component	TYPE A	HC/CH_4 (%LEL、vol%), O_2, H_2S, CO
4-component	TYPE B	HC/CH_4 (%LEL), O_2, H_2S, CO
3-component	TYPE C	HC/CH_4/C_2H_2 (%LEL), O_2, H_2S
	TYPE D	HC/CH_4 (%LEL), O_2, CO
	TYPE E	HC/CH_4/H_2 (%LEL, vol%), O_2
2-component	TYPE F	HC/CH_4/C_2H_2 (%LEL), O_2
	TYPE G	H_2 (%LEL), O_2

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Portable
Multi Gas Detector

Model:
GX-6000

Features

- A single unit can simultaneously display up to six types of gases, including VOCs. This product is the first of its kind from a Japanese manufacturer.
- The PID sensor enables measurements of more than 200 types of target chemical substances.
- Ideal for checking the risks and hazards of chemical substances as required under the Industrial Safety and Health Act
- Support for multilingual display (Japanese, English, French, Spanish, etc.)
- Equipped with convenient new functions, including panic alarm and LED flashlight

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GP-03 (For combustible gases)

OX-03 (For oxygen)

HS-03 (For hydrogen sulfide)

CO-03 (For carbon monoxide)

Personal
Single Gas Monitors

Model:
03 series

Features

- Models powered by rechargeable batteries have been added to the product line.
- Standard protective cover protects the main unit from scratches, dirt, and impact.
- Compact, lightweight design doesn't interfere with work.
- Inherently safe and explosion-proof enclosure is ideal for use in hazardous locations.

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Four Gas Personal Monitor

Model: GX-2009

Features

- Explosion-proof product that can be used in hydrogen/acetylene atmospheres
- Protection rating equivalent to IP 67 ensures safe use for outdoor work.
- Three-direction alarm lamps and two-direction alarm buzzers to alert both the carrier and those in surrounding areas
- Buzzer volume of 95 dB or more can be clearly heard even in noisy factory environments.
- Simultaneous display of gas concentrations of up to four components on large LCD screen
- Also equipped with clock display and data logger functions

Type list

Components	Type	Gas types
4-component	TYPE A/H/T	O_2, LEL, H_2S, CO
3-component	TYPE B/H/T	O_2, LEL, H_2S
	TYPE C/T	O_2, LEL, CO
2-component	TYPE D/T	O_2, LEL
	TYPE E/H/T	O_2, H_2S
	TYPE F/T	O_2, CO
	TYPE I/T	LEL, CO
	TYPE J	H_2S, SO_2

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Fixed PID
VOC Monitor

Model:
RVOC

Features

- Photoionization detector ideally suited for VOC detection
  Supports three different measurement ranges (0–10 ppm, 100 ppm, 1,000 ppm).
  Sensor design resists humidity and keeps the lamp from fouling.
  Measurement cycles can be set to up to 5 minutes and 50 seconds in 10-second intervals.
  (Default: 1 minute)
- Functions to improve work efficiency
  Easy integration with control systems (4 mA to 20 mA output)
  Also supports switchable type (RVOC-10s).

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Features

- LCD screen illuminates in green, orange, or red depending on operating status for easy visibility.
- Choice of three power sources to suit operating environments: AC power, DC power, or battery
- Allows measurements at distances of up to 20 m with optional remote sensor.

Indoor Carbon Monoxide Monitor

Model: EC-600

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Features

- Inherently safe explosion-proof construction
- Detects a wide range of different gases
- Dustproof and waterproof for use in all types of environments
- Adjustable alarm volume
- Easy-to-read dual display (digital/analog)
- Selectable target gas detection

Portable Toxic Gas Monitor

Model:
SC-8000

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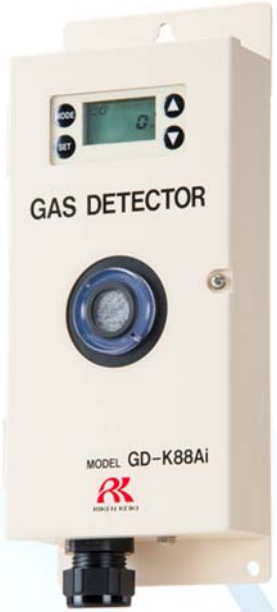

[Diffusion type]

GD-K88Ai
(For toxic gases)

GD-F88Ai
(For oxygen)

[Suction type]

GD-K88Di
(For toxic gases)

GD-F88Di
(For oxygen)

Features

- Two-wire gas detector
  Transmits directly to control systems.
- Includes pressure correction sensor to minimize the effects of variations in atmospheric pressure.
  (GD-F88Ai, GD-F88Di)
- Built-in aspirator (optional)
  Built-in type changed from previous external units
  (GD-K88Ai, GD-K88Di)
- Designed to resist corrosive gases
  SUS enclosure can be specified at customer's request.
- Inherently safe explosion-proof construction in combination with safety barrier

Inherently Safe Explosion-proof Construction
Oxygen/Toxic Gas Detector Heads

Model: GD-88 series

RIKEN KEIKI

Intelligent
Gas Detector

Model:
GD-70D

Features

- Standardized body unit with universal design for any detection principle
- Uses reusable components.
- Made of recyclable materials to reduce environmental burdens
- Designed to comply with a wide range of international standards
- Complies with RoHS Directive and CE Marking requirements.
- Supports various communication systems.

  Standard instrumentation signal analog transmission (4-20 mA) DC system (GD-70D)

  DC power-line carrier system using the same wiring for power and communication (GD-70D-NT)

  Ethernet system using PoE hub (GD-70D-EA)

RIKEN KEIKI

Features

- High selectivity with minimal interference from other gases
- Rapidly detects even minute environmental fluctuations.
  (Detects at ppb levels.)
- Cassette type for easy tape replacement
  (Uses micro cassette)

Highly Sensitive
Toxic Gas Monitor

Model:
FP-300

RIKEN KEIKI

Features

- A single unit can measure up to eight different gas types.
- Two selectable suction methods
  Automatic suction using built-in pump or manual suction using hand aspirator
- Includes intermittent measurement mode (with automatic suction only).
  Records concentrations against time to allow monitoring of gas concentration trends on the main unit.
- Large easy-to-read LCD screen
  Clear display showing measured gas type, gas concentration, measurement units, and battery level

Optical Gas Indicator

Model:
FI-8000

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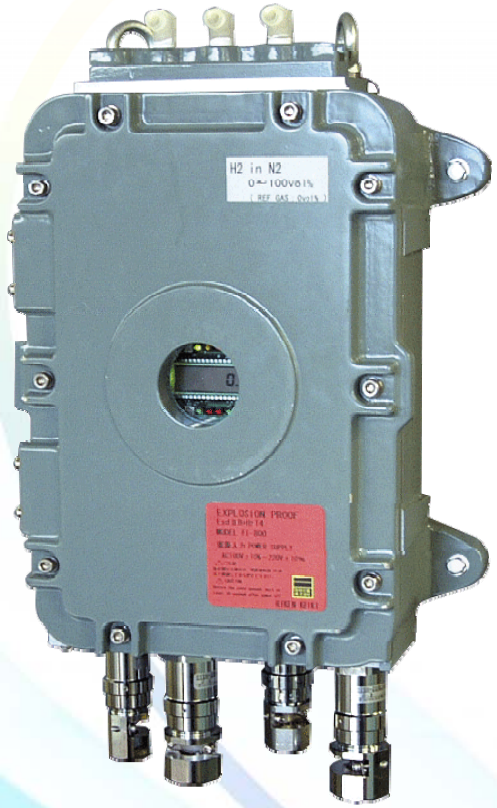

Features

- Zero warmup time
- Rapid response
- Long-term consistency
- Easy operation and easy-to-read digital display
- No sensitivity degradation due to silicone
- Includes temperature and atmospheric pressure correction functions.

Gas Analyzer

Model:
FI-800

RIKEN KEIKI

Features

- Zero warmup time
- Rapid response
- Long-term consistency
- Easy operation and easy-to-read digital display
- No sensitivity degradation due to silicone
- Includes temperature and atmospheric pressure correction functions.

Compact Solvent
Gas Monitor

Model:
FI-815A

RIKEN KEIKI

Features

- Reliably and rapidly detects minute town gas and LPG gas leaks.
- Compact and lightweight with sturdy housing
- Built-in filter for improved sensor durability
- Includes data-logging function.
  (Records up to 256 time/date and gas concentration readings.)
- Includes LED light for accurate measurements even in dark locations.

Portable
Gas Leak Checker

Model: SP-220
TYPE ML

RIKEN KEIKI

International Agents

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International Agents

North America

South America

Asia and Pacific

Russia and Central Asia

Europe

Middle East

Africa

RIKEN KEIKI

International agents (table of contents)

North America	U.S.A.				
South America	Brazil	Argentina	Peru	Chile	Uruguay
Asia and Pacific	China	South Korea	Taiwan	Singapore	Malaysia
	Indonesia	Thailand	India	Vietnam	Philippines
	Australia				
Europe	Germany	Greece	THE NETHERLANDS	Norway	Turkey
	U.K.				
Middle East	U.A.E.	Israel			
Africa	South Africa				
Russia and Central Asia	Russia				

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WEBSITE : http://preventgas.com.ar/

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WEBSITE :	http://www.resetnaval.com/

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WEBSITE : http://www.electronicmarine.cl

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PERSON : Dra.Nermys Hernandez
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dl102@rkkc.net (Ms. Xu fei)

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E-MAIL : master@rikenkeiki.co.kr PERSON： MR.SUN-GU,LEE
WEBSITE :
(KOREAN) http://rikenkeiki.co.kr/bn/
(ENGLISH) http://rikenkeiki.co.kr/bn/english/

HIGH INTEGRATED TECHNOLOGY, INC.

ADDRESS : 72, SEGYOSANDAN-RO, PYEONGTAEK-SI, GYEONGGI-DO, 17843, KOREA
TEL : 82-31-650-7000 FAX： 82-31-650-7007
E-MAIL : info@hitinc.co.kr PERSON： MR.HYUNG-SIL, KIM
WEBSITE :
(KOREAN) http://www.hitinc.co.kr/
(ENGLISH) http://www.hitinc.co.kr/?strMode=company_e/company

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PERSON : MR. SEITARO TAKAHASHI (PRESIDENT)

WEBSITE : http://www.rikenkeiki.com.tw/admin/news/front/news.php

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ADDRESS : NO.2, ALY.14, LN.150-30, SEC.3, XITUN RD., XITUN DIST., TAICHUNG CITY 407, TAIWAN

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FAX : 886-4-2462-5508

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PERSON : MR. WU WEN CHENG

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FAX :	603-5542-2289
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PERSON :	MR. CHOOI CHOON KEET (GENERAL MANAGER)
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RIKEN KEIKI

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PERSON : MR. CAO MINH LOI (Director)

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PERSON : MR. SHINTARO ONO(Managing Director)

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PERSON : MR. ALPEEV M.A., (MANAGER)

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We are a pioneer in creating safe working environments for workers.