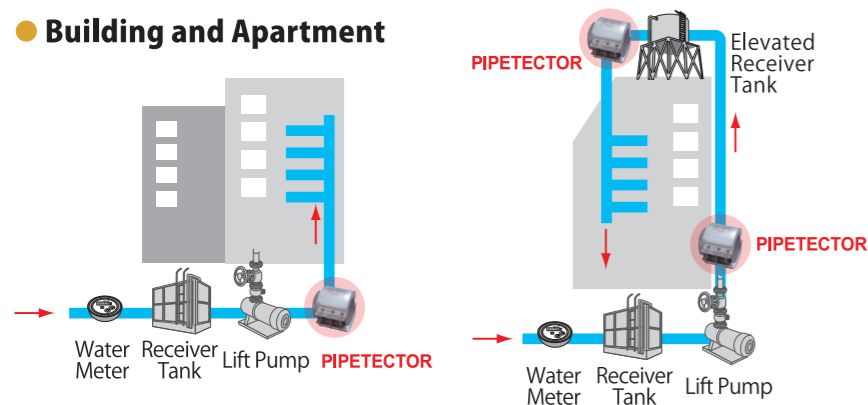
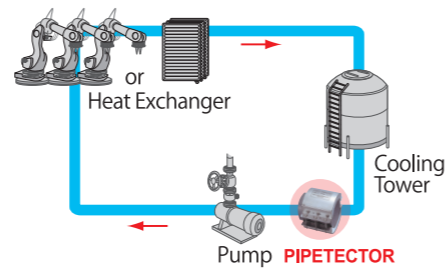


## Location of PIPETECTOR®

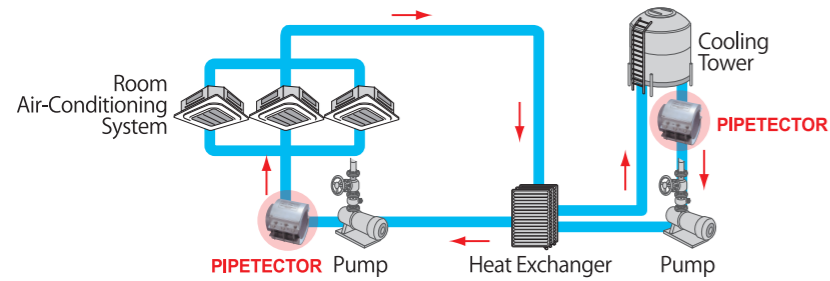
### ● Building and Apartment



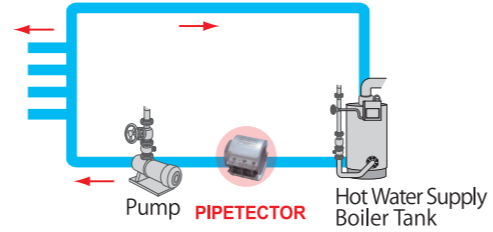
### ● Cooling Water Pipe / Circulation



### ● Cooling Water / Circulating Water



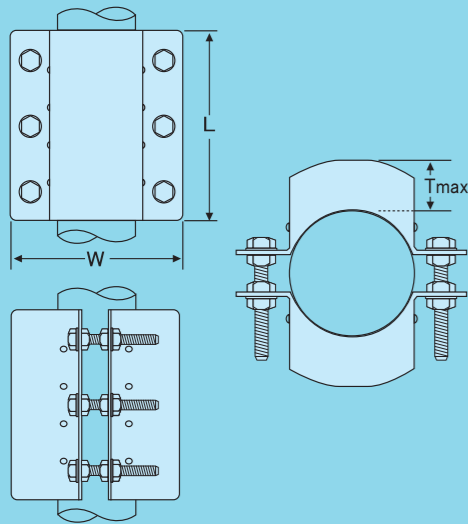
### ● Hot Water Pipe / Boiler



## Water System Key Information

1. As the effect of PIPETECTOR® lasts for 6 hours, the water needs to flow or be drawn off sufficiently to benefit from the effect.
2. An insulator has to be fitted on hot water pipes to reduce the temperature underneath PIPETECTOR® to below 60°C.

## Size of PIPETECTOR®



Product Number	W × L × Tmax	Weight (kg)	Diameter of Water Pipes (mm)
PT-30DS	85.8 × 121.5 × 27mm	0.8kg	25~32mm
PT-50DS	115.5 × 121.5 × 27mm	1.2kg	40~50mm
PT-75DS	144.1 × 121.5 × 27mm	1.7kg	65~80mm
PT-100DS	169.3 × 121.5 × 27mm	2.0kg	100mm
PT-125DS	194.8 × 121.5 × 27mm	2.4kg	125mm
PT-150DS	220.2 × 121.5 × 27mm	2.8kg	150mm
PT-200DS	271.3 × 121.5 × 27mm	3.5kg	200mm
PT-250DS	322.4 × 121.5 × 27mm	4.8kg	250mm
PT-300DS	373.5 × 121.5 × 27mm	5.6kg	300mm
PT-400DS~PT-2000DS			400~2000mm

**New  
Technology**

**Eliminates internal corrosion in hot, cold and chilled water systems**

**Pipe Renewal Device**

**PIPETECTOR®**

For Building and Industrial Water Pipes

Patents Registered in: Japan (2007); and USA (2009)

- External collar fits pipes up to 2 metres wide
- Needs no :
  - pipe cutting
  - electrical power
  - maintenance
  - chemicals
- Eliminates and prevents internal corrosion
- Restores pipe work integrity
- 10 years' Product Warranty



**Contribute to Health and Environment**  
**Japan System Planning Co., Ltd.**

2-21-12 Sasazuka, Shibuya-ku, Tokyo, 151-0073, Japan  
**T e l : + 8 1 ( 0 ) 3 3 3 7 7 2 3 3 9**  
**F a x : + 8 1 ( 0 ) 3 3 3 7 7 7 2 3 3**  
**Website : <https://jsp-world.com/en/>**

**Contribute to Health and Environment**  
**Japan System Planning Co., Ltd.**  
 Japan System Planning Co., Ltd., all rights reserved PIPETECTOR®

# Best solution for corrosion inside water pipes

Inside iron and steel water pipes, it is recognised that corrosion (iron hydroxide oxide) normally will form. When a power station was shut down for maintenance in the 1960s, it was found, surprisingly, there was no corrosion in its steam pipes. It was then discovered that hydrated electron had prevented corrosion. The water treated by PIPETECTOR® can generate hydrated electron when it is moved.

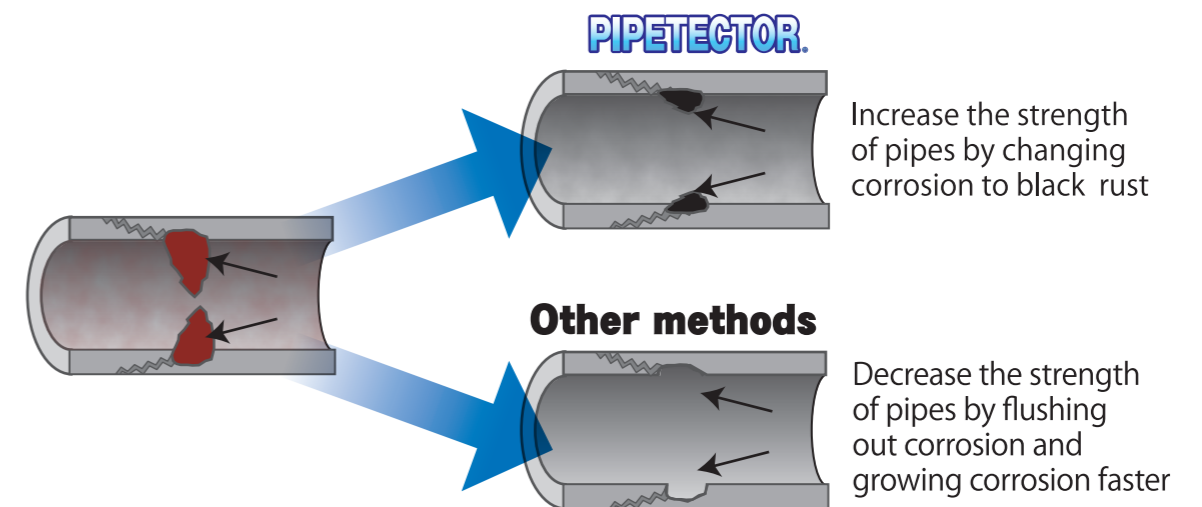
Corrosion blocks flow, discolours water making it unattractive and unusable for some applications and weakens pipes. Single cell bacterium, such as anaerobic sulphate reducing bacterium (SRB), can create pinhole leaks, causing damage and lead to difficult, time-consuming and expensive pipe replacement.

## The only equipment for pipe renewal

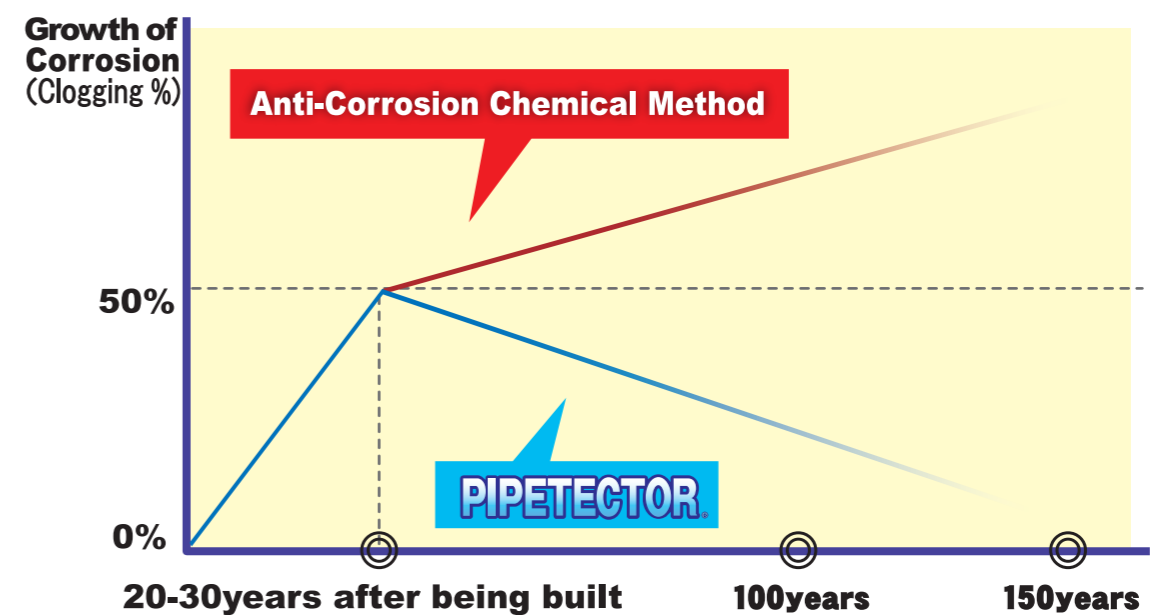
### Characteristics

- PIPETECTOR® converts corrosion to black rust (magnetite), which is 10 times smaller, does not dissolve in water and:
  - Protects the pipe from corrosion
  - Kills single cell bacterium
  - Eliminates pinholes and restores pipe strength
  - Prevents electrolysis between dissimilar metals (eg galvanised iron and copper)
  - Prolongs the life of the pipe
- Once the corrosion, developed in water pipes, is changed to 100% black rust, it makes it possible to use the pipes almost indefinitely.
- Discolouration of water by corrosion ceases.
- Uniquely, PIPETECTOR® restores wall thickness and the strength of pipes.
- PIPETECTOR® converts corrosion to black rust (magnetite), which has 10 times less volume, does not dissolve in water and practically removes any blockages.
- PIPETECTOR® is installed on the outside of pipes up to 2 metres in diameter.
- Product Warranty is 10 years.
- Expected life is 40 years minimum.

PIPETECTOR® is the only equipment which can change Corrosion (Iron Hydroxide Oxide –  $\text{FeO}(\text{OH})$ ) to Black Rust (Magnetite –  $\text{Fe}_3\text{O}_4$ ) without outflow of corrosion.



## Comparison between PIPETECTOR® and conventional methods



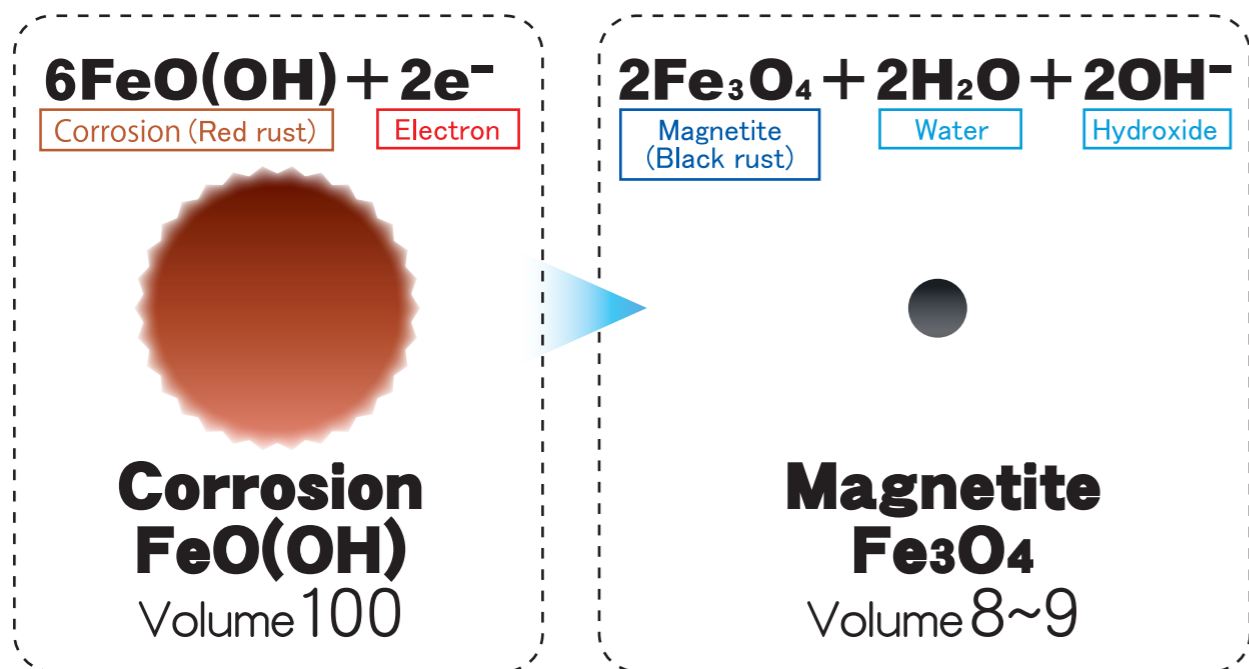
## PIPETECTOR® can change FeO(OH) corrosion to Fe<sub>3</sub>O<sub>4</sub> magnetite as follows:

### Oxidation mechanism of iron inside the water pipe

1 Water molecules and oxygen oxidise iron, which changes to iron hydroxide oxide.



2 Corrosion(iron hydroxide oxide) is reduced when it receives negatively charged electrons (e<sup>-</sup>), and forms black coloured hard crystals of fine particles with the separation of H<sub>2</sub>O and O<sub>2</sub> molecules and changes to very hard black coloured magnetite (Fe<sub>3</sub>O<sub>4</sub>), whose cubic volume is one tenth that of corrosion. The magnetite hard layer bonds to the inner surface of the pipe and considerably decrease the blockage of corrosion in the pipe.



## PIPETECTOR® can stop making copper oxide as follows:

### Oxidation mechanism of copper inside the water pipe

Oxygen in water oxidises copper to copper oxide.



※ This reaction can be stopped by supplying electrons.

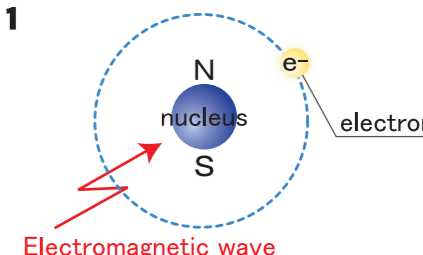
## NMR re-arranges electronic bonds to break up big water clusters into small ones

### 1 What is Nuclear Magnetic Resonance

The atomic nucleus of an atom having an odd atomic number, for example, hydrogen has the atomic number one, has a north and a south pole (see Figure 1).

If specific length of electromagnetic wave is applied to this polarized atomic nucleus of hydrogen, resonance is caused on the nucleus. This phenomenon is called nuclear magnetic resonance.

Fig 1



### 2 Activation of water molecules

The combined angle of an H-O-H water molecule (H<sub>2</sub>O) is 104.5° (see Figure 2), therefore, hydrogen is positively charged and oxygen is negatively charged. A negatively charged oxygen is attracted by a positively charged hydrogen. In water (H<sub>2</sub>O), molecules combined together to form big clusters (see Figure 3) normally 64 or more molecules. In this state the position of hydrated electron is inside of big cluster. However, position of hydrated electron on small cluster is changed to outside of the cluster when cluster is changed from big to small by the NMR effect of PIPETECTOR®.

Fig 2

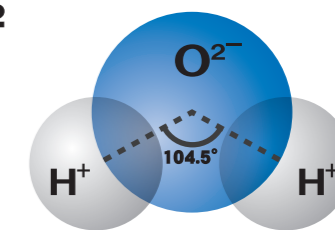
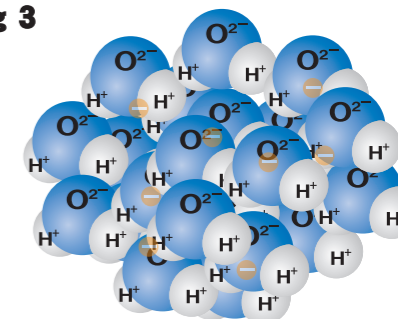
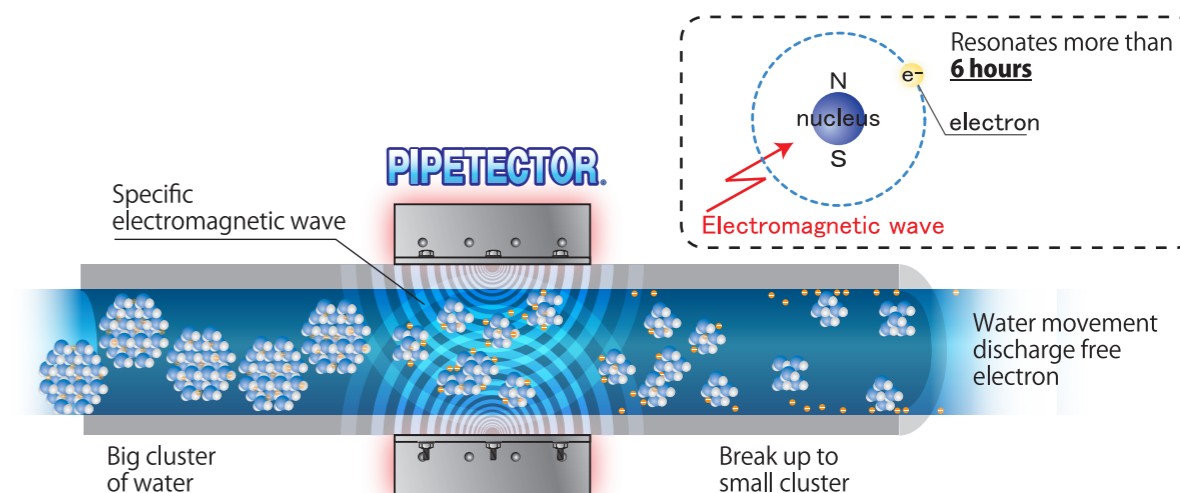


Fig 3



### 3 The NMR effect

PIPETECTOR® generates specific length of electromagnetic wave and causes the breakup of big clusters of water molecules into small clusters and makes them to resonate (spin). This resonant state continues more than 6 hours when water with this state moves by power of natural drop or by pump then hydrated electrons are discharged. Then, the corrosion(FeO(OH)), which may be present in the pipe, is changed to a black rust or magnetite film (Fe<sub>3</sub>O<sub>4</sub>) and is bonded to the pipe wall. This not only makes the pipe stronger it also protects the pipe wall from further corrosion and prolongs its life.



## Introduction examples

### British Museum, London



#### UK Case Study



Building	National museum built in 1753	
Place	Main central heating	
PIPETECTOR®	PT-250DS × 1 unit	
Effect of installation of PIPETECTOR®		
Result	Before Installation	After 5 Weeks
Iron content (mg/l)	20.0	0.2

### Harrods, Knightsbridge, London



#### UK Case Study



Building	Department store opened in 1849 Department store reopened in 1905	
Place	Domestic hot water pipe work	
PIPETECTOR®	PT-150DS × 1 unit	
Effect of installation of PIPETECTOR®		
Result	Before Installation	After 9 Weeks
Iron content (mg/l)	1.294	0.022

### BBC Television Studios, White City, London



#### UK Case Study



Building	BBC television centre built in 1953	
Place	Main Block chilled water pipe work Stage Five chilled water pipe work	
PIPETECTOR®	PT-250 DS x 4 units	
Effect of installation of PIPETECTOR®		
Result	Before Installation	After 8 Weeks
Iron content (mg/l)	Main Block	5.53
	Stage 5	0.008

### Royal Bank of Scotland No.250, London



#### UK Case Study



Building	18-year-old, 11-story bank building	
Place	Central Heating Pipework	
PIPETECTOR®	PT-200DS × 1 unit	
Effect of installation of PIPETECTOR®		
Result	Before Installation	After 1 Years
Iron content (mg/l)	1.1	0.03

### Royal Garden Hotel, Kensington, London



#### UK Case Study



Building	Five-Star Hotel built in 1965	
Place	Domestic hot water pipe work system	
PIPETECTOR®	PT-200DS × 1 unit	
Effect of installation of PIPETECTOR®		
Result	Before Installation	After 5 Weeks
Iron content (mg/l)	2.79	0.013

### Huong Canh District Water Main, Vinh Phuc Province



#### Vietnam Case Study



Building	15-year-old underground water main	
Place	150-mm diameter galvanized steel water main	
PIPETECTOR®	PT-150DS × 1 unit	
Effect of installation of PIPETECTOR®		
Result	Before Installation	After 3 Years
Iron content (mg/l)	23	< 0.03

### Addenbrooke's Hospital, Cambridge



#### UK Case Study



Building	One of the largest hospitals in the UK with 1,300 beds	
Place	Outlet of domestic hot water pipe work	
PIPETECTOR®	PT-75DS x 2 units	
Effect of installation of PIPETECTOR®		
Result	Before Installation	After 9 Weeks
Iron content (mg/l)	1.07	0.11

### Japanese Red Cross Kumamoto Hospital



#### Japan Case Study



Building	16-year-old hospital with 490 beds	
Place	Domestic cold tap, air-conditioning, domestic hot water piping	
PIPETECTOR®	A combined total of ten units	
Effect of installation of PIPETECTOR®		
Result	Before Installation	After 7 Weeks
Iron content (mg/l)	69.1	0.03