

NMR PIPETECTOR Scientific Report (No.7)

Anti-Corrosion Application, Hospital Matsumoto Dental College Hospital (Hot and Cold water Line)

NMR Corporation

To stop corrosion and prolong useful life of water pipe



Appearance of the building

◆ Installation Results

The hospital building has been planned to be rebuilt within 10 years, because it has been 27 years since it was built, and the corrosion colored water, which appeared from hot and cold water supply pipes, was serious because water examination showed that Fe content in water was 17mg/l and colored was 430 degrees as maximum, so they were thinking of replacing pipes with new ones. However, the cost for the replacement of pipes was more than US\$2 millions which was too expensive for them, so

they decided to install NMR PIPETECTOR whose cost was less than 1/10 of the replacement of pipes, and moreover, NMR PIPETECTOR could stop corrosion colored water and reduce corrosion to magnetite, and protect the pipes.

As a result, before the installation of NMR PIPETECTOR, Fe content in water at all 16 faucets were much over 0.3mg/l that was the government regulation for drinking water in Japan. In 6 months, Fe content at almost all the faucets became lower than the government regulation. Much more water was used in the kitchen, therefore, water quality was improved immediately and **Fe content decreased from 1.70mg/l to 0.03mg/l in only 2 months**. Because of the immediate effect that was confirmed, NMR PIPETECTOR was adopted.

◆ Installation Summary

Name of Building	Matsumoto Dental College Hospital
Address	Nagano Prefecture, Japan
Building Summary	11- story Hospital Building (27 years after being built)
Installation Date	August 25, 26, 1998
Installation Place Number of Installed NMR PIPETECTOR	On outlet pipe of water meter (SGP 80mm) NMR PIPETECTOR PT- 75DS×1 unit On outlet pipe of receiver tank (SGP 80, 100mm) NMR PIPETECTOR PT- 75DS×2 units NMR PIPETECTOR PT-100DS×2 units On outlet pipe of storage tank (SGP 80mm) NMR PIPETECTOR PT- 75DS×2 units On outlet pipe of elevated tank (SGP 150mm) NMR PIPETECTOR PT- 150DS×2 units

◆ Results of Water Examinations

Fe content in water (mg/l)	Before the installation August 17, 1998	2 months after the installation October 19, 1998	Government Regulation (Japan)
6F Operation Hot water Cold water	5.30 (mg/l) 1.60 (mg/l)	0.25 (mg/l) 0.20 (mg/l)	Less than 0.3(mg/l)
2F Pediatrics Hot water Cold water	2.10 (mg/l) 3.30 (mg/l)	0.12 (mg/l) 0.30 (mg/l)	
5F Surgery Hot water	9.20 (mg/l)	0.03 (mg/l)	
1F Kitchen Cold water	1.70 (mg/l)	0.03 (mg/l)	

◆ Installation place



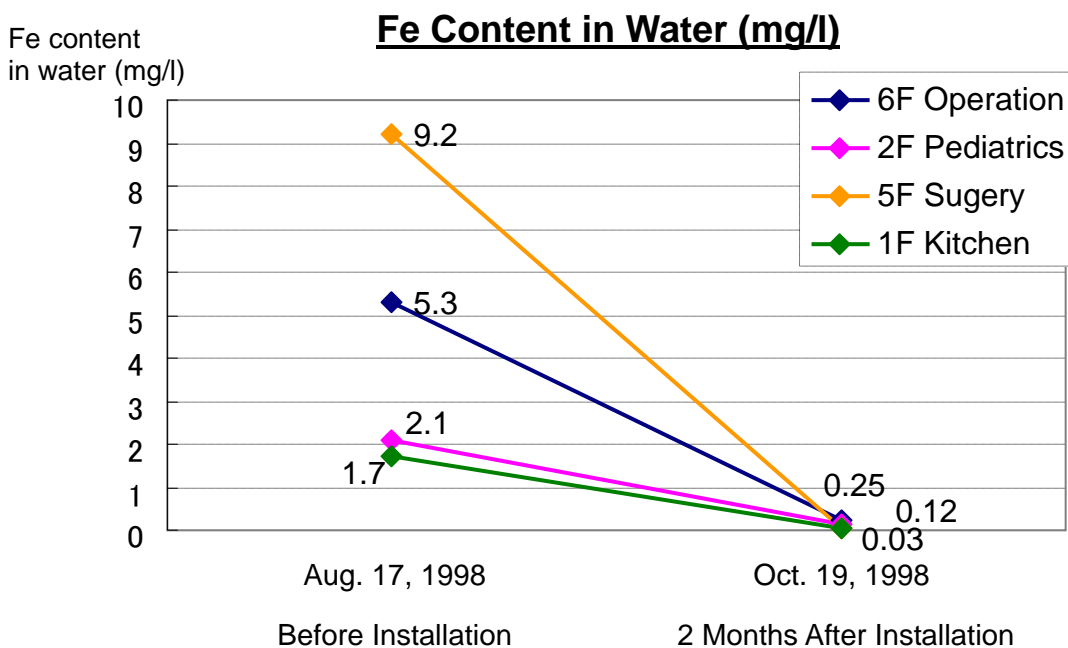
Storage tank
PT- 75DS



On outlet pipe of elevated tank
PT-150DS



On outlet pipe of receiver tank
PT- 75DS · PT-100DS



Matsumoto Dental College Hospital
For anti-corrosion colored water (Water Examination Result)

Before the installation

September 16, 1998
Sample Water taken: August 17

Place of water taken	PH	Colored	Cleanness	Fe
Regulation	Over 5.8 Under 8.6	Under 5 degrees	Under 2 degrees	Under 0.3 degrees
①6F Operation				
Hot water	7.4	94	16	5.30
Cold water	7.3	25	3	1.60
②5F Surgery				
Hot water	7.5	120	19	9.20
Cold water	7.3	92	16	4.10
③4F Prosthesis				
Hot water	7.4	3	1	0.38
Cold water	7.6	7	1	0.62
④3F Preserve				
Hot water	7.5	110	20	6.40
Cold water	7.3	27	2	0.95
⑤2F Pediatrics				
Hot water	7.4	15	3	2.10
Cold water	7.3	61	13	3.30
⑥1F First visitor				
Hot water	7.6	34	11	4.20
Cold water	7.5	4	1	4.10
⑦1F Kitchen				
Hot water	7.5	8	2	0.67
Cold water	7.5	13	5	1.70
⑧BF Boiler				
Hot water	7.5	430	120	17.0
Cold water	7.5	44	10	1.70
⑨Outdoor receiver tank				
Water supply	7.6	1	1	0.03

Matsumoto Dental College Hospital
For anti-corrosion colored water (Water Examination Result)

1 Month after the installation

September 28, 1998
Sample Water taken: September 21

Place of water taken	PH	Colored	Cleanness	Fe
Regulation	Over 5.8 Under 8.6	Under 5 degrees	Under 2 degrees	Under 0.3 degrees
①6F Operation				
Hot water	7.6	15	2	0.61
Cold water	7.6	15	2	0.51
②5F Surgery				
Hot water	7.6	36	4	1.50
Cold water	7.3	72	15	3.80
③4F Prosthesis				
Hot water	7.6	8	1	0.27
Cold water	7.5	5	1	0.15
④3F Preserve				
Hot water	7.6	17	1	0.75
Cold water	7.7	13	2	0.46
⑤2F Pediatrics				
Hot water	7.6	10	1	0.28
Cold water	7.5	11	1	0.28
⑥1F First visitor				
Hot water	7.7	21	4	0.68
Cold water	7.4	20	3	0.47
⑦1F Kitchen				
Hot water	7.6	2	1	0.10
Cold water	7.6	3	1	0.07
⑧BF Boiler				
Hot water	7.4	18	3	0.64
Cold water	7.5	11	1	0.34
⑨Outdoor receiver tank				
Water supply	7.6	1	1	0.03

Matsumoto Dental College Hospital
For anti-corrosion colored water (Water Examination Result)

2 Months after the installation

October 30, 1998
Sample Water taken: October 19

Place of water taken	PH	Colored	Cleanness	Fe
Regulation	Over 5.8 Under 8.6	Under 5 degrees	Under 2 degrees	Under 0.3 degrees
①6F Operation				
Hot water	7.6	21	2	0.25
Cold water	7.9	14	1	0.20
②5F Surgery				
Hot water	7.7	4	1	0.03
Cold water	7.6	43	8	1.10
③4F Prosthesis				
Hot water	7.6	5	1	0.06
Cold water	7.7	20	1	0.51
④3F Preserve				
Hot water	7.7	14	1	0.19
Cold water	7.5	23	2	0.38
⑤2F Pediatrics				
Hot water	7.6	7	1	0.12
Cold water	7.5	16	1	0.30
⑥1F First visitor				
Hot water	7.8	26	4	0.45
Cold water	7.6	27	3	0.52
⑦1F Kitchen				
Hot water	7.7	3	1	0.04
Cold water	7.5	2	1	0.03
⑧BF Boiler				
Hot water	7.7	3	1	0.59
Cold water	7.6	23	1	0.41
⑨Outdoor receiver tank				
Water supply	7.6	1	1	0.03

Before the installation

1 Month after the installation

2 Months after the installation

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給水管及び給湯管赤水対策（水質結果）

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平成10年 9月16日

平成10年 9月28日

平成10年10月30日

採水日 8月17日

採水日 9月21日

採水日 10月19日

採水場所 (水道法基準値)	PH 5.8以上8.6以下 (参考値)	色度 5度以下	濁度 2度以下	鉄 0.3mg/L以下
①6階 手術 給湯水	7.4 7.3	94 25	16 3	5.30 1.60
②5階 外科 給湯水	7.5 7.3	120 92	19 16	9.20 4.10
③4階 補綴 給湯水	7.4 7.6	3 7	1 1	0.38 0.62
④3階 保存 給湯水	7.5 7.3	110 27	20 2	6.40 0.95
⑤2階 小児 給湯水	7.4 7.3	15 61	3 13	2.10 3.30
⑥1階 初診 給湯水	7.6 7.5	34 4	11 1	4.20 4.10
⑦1階 厨房 給湯水	7.5 7.5	8 13	2 5	0.67 1.70
⑧地階 ボイラー 給湯水	7.5 7.5	430 44	120 10	17.00 1.70
⑨屋外 受水槽(原水) 給水	7.6	1	1	0.03

採水場所 (水道法基準値)	PH 5.8以上8.6以下 (参考値)	色度 5度以下	濁度 2度以下	鉄 0.3mg/L以下
①6階 手術 給湯水	7.6 7.6	15 15	2 2	0.61 0.51
②5階 外科 給湯水	7.6 7.3	36 72	4 15	1.50 3.80
③4階 補綴 給湯水	7.6 7.5	8 5	1 1	0.27 0.15
④3階 保存 給湯水	7.6 7.7	17 13	1 2	0.75 0.46
⑤2階 小児 給湯水	7.6 7.5	10 11	1 1	0.28 0.28
⑥1階 初診 給湯水	7.7 7.4	21 20	4 3	0.68 0.47
⑦1階 厨房 給湯水	7.6 7.6	2 3	1 1	0.10 0.07
⑧地階 ボイラー 給湯水	7.4 7.5	18 11	3 1	0.64 0.34
⑨屋外 受水槽(原水) 給水 (採水日 平成10年 9月 9日)	7.6	1	1	0.03

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①6階 手術 給湯水	7.6 7.9	21 14	2 1	0.25 0.20
②5階 外科 給湯水	7.7 7.6	4 43	1 8	0.03 1.10
③4階 補綴 給湯水	7.6 7.7	5 20	1 1	0.06 0.51
④3階 保存 給湯水	7.7 7.5	14 23	1 2	0.19 0.38
⑤2階 小児 給湯水	7.6 7.5	7 16	1 1	0.12 0.30
⑥1階 初診 給湯水	7.8 7.6	26 27	4 3	0.45 0.52
⑦1階 厨房 給湯水	7.7 7.5	3 2	1 1	0.04 0.03
⑧地階 ボイラー 給湯水	7.7 7.6	3 23	1 1	0.59 0.41
⑨屋外 受水槽(原水) 給水 (採水日 平成10年 9月 9日)	7.6	1	1	0.03

*今回設置する装置でのPH値に影響は与えませんが参考値とする。

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